DINAMAP®

PRO 1000V3 Monitor Pre-Service and Calibration Manual

GE Medical Systems
Information Technologies

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List of Effective Pages

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GENERAL MAINTENANCE

1.1 INTRODUCTION

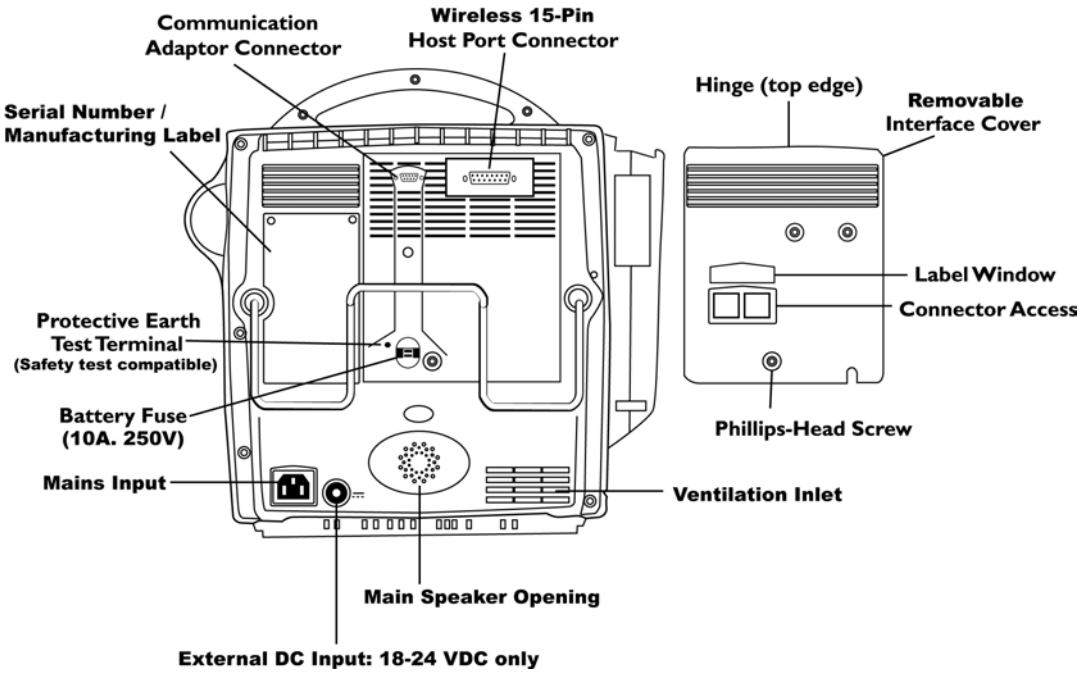
This section contains general DINAMAP PRO 1000V3 Monitor service procedures, including alarm code interpretation, service mode operation, periodic maintenance, and battery care.

1.2 SETTING UP THE DINAMAP PRO 1000V3 MONITOR FOR THE FIRST TIME

1.2.1 Unpacking and Preparation for Installation

Unpack and identify the contents of all shipping materials:

1. Remove the Monitor.
2. Unpack the AC cord but ***do not*** plug the Monitor in at this time.
3. Turn the Monitor to the backside for access to the Host Comms Cover.

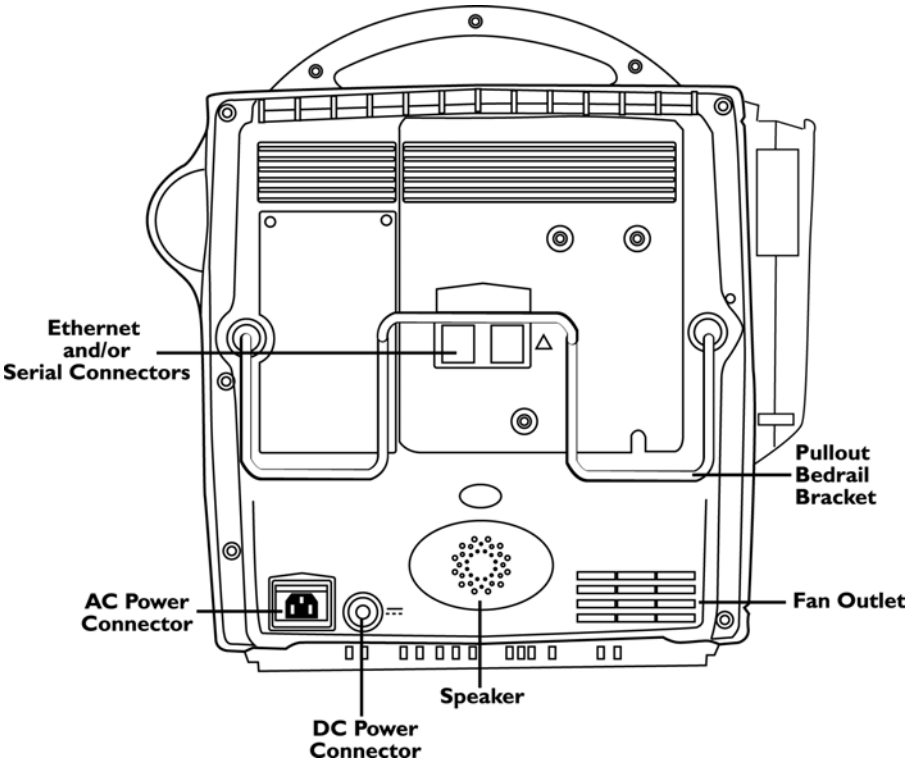


Rear View of Monitor

4. Use a Phillips-head screwdriver to remove the single screw that secures the Host Comms cover.
5. The Battery fuse and the Fuse Holder are not connected at time of

shipment. Locate and remove the fuse and fuse.

6. Identify the Battery Fuse holder located within the Host Comms well, behind the Host Comms cover, near the lower left side.
   Note: The battery is not located behind the Host Comms cover.
7. Insert the Battery Fuse into the Battery Fuse holder.
8. Press the Battery Fuse Holder into the Battery Fuse mount using thumb pressure until it is securely snapped in place.
9. Replace the Host Comms cover; refasten the Phillips screw. Tighten using hand-tools only.
10. Plug the AC cord into the AC Mains input at the back of the Monitor.



Rear View of Monitor

11. Plug the AC cord into a Hospital Grounded AC receptacle. A green LED illuminates on the front of the Monitor indicating that an AC source is available.

    Prior to usage, it is necessary to charge the Monitor for 12 hours. This calibrates the battery circuitry with the charge status of the battery.

1.2.2 Set the Date and the Clock

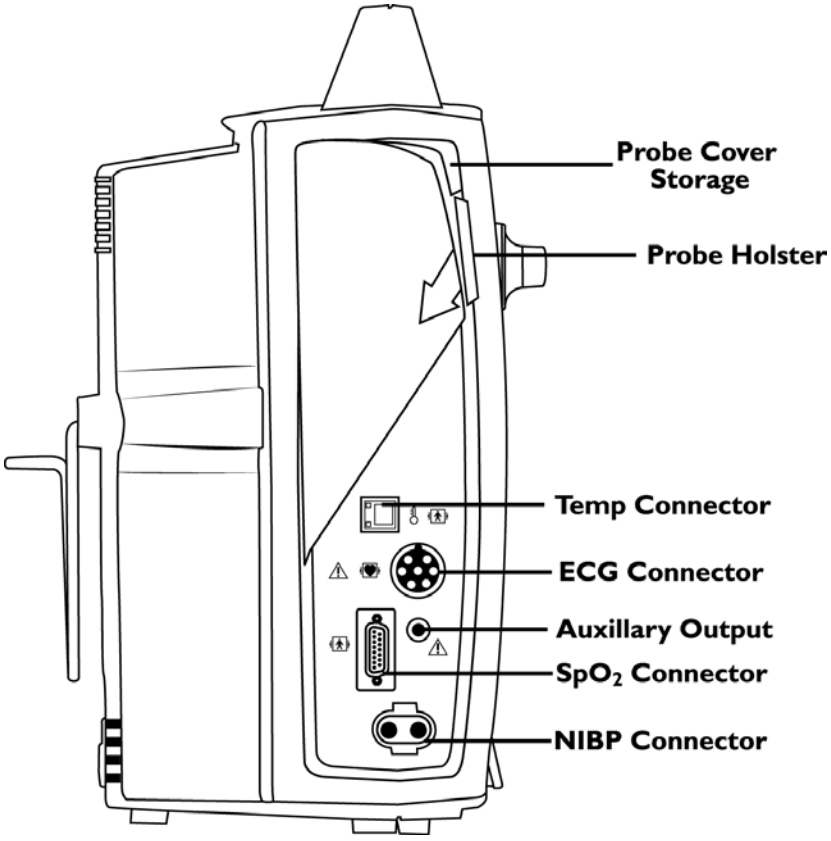
The Monitor uses a *Select*Knob to navigate through the menu systems. Rotating the *Select*Knob moves the arrow cursor, and pressing the *Select*Knob makes the selection.

1. Power on the Monitor using the **OFF/ON** button.
2. Use the *Select*Knob to select the ***no*** option when the Monitor prompts to admit a new patient.
3. Press or turn the *Select*Knob to access the main menu.
4. Turn the *Select*Knob to scroll down the menu. The arrow at the bottom of the list indicates that the list continues on a second screen. Highlight the **other system settings** option and press the *Select*Knob.
5. Turn the *Select*Knob to scroll down the menu to highlight the **Adjust date & time** option. Press the *Select*Knob to continue.
6. Turn the *Select*Knob to scroll down and highlight the appropriate date and time components to be changed if necessary (Month, Day, Year, Hour, Minute, Second). Press the *Select*Knob. The field is displayed in a box. Turn the *Select*Knob to the desired number and press the *Select*Knob.
7. After all of the settings are changed, use the *Select*Knob to scroll down and highlight the **set new time and date** option. Press the *Select*Knob to save the settings and continue.
8. The message, ***CAUTION!*** *This will delete all trends, and stored waveforms. Are you sure you want to do this?,* displays. Highlight the **yes** option and press the *Select*Knob.

   A pop-up window displays the message, *Clearing all trends, and waveforms*, to confirm that the function is processing.

1.2.3 Parameter Level Functional Testing

After the initial configuration is complete, perform functional testing of each of the parameters. Using the accessories supplied with the Monitor, initialize the Monitor in such a way that only one parameter is functioning at a time.



Left Side View of Monitor

Functional tests to be performed:

- A blood pressure test is carried out by connecting the supplied hose and cuff together, then attaching them to the NIBP Connector on the left side of the Monitor. Press the GO/STOP hardkey on the front to begin the NIBP cycle.
- Connect the supplied temperature probe to the corresponding connection (see illustration above). A predictive temperature begins once the probe is removed from the holster on the left side. Replace the probe after completion of the Temp cycle.

The SpO_2 sensor used depends on the Monitor configuration.

Nellcor SpO_2 configured monitors use an assembly consisting of two parts: the DS-100A, and the extender cable DOC-10.

Masimo SpO_2 configured monitors use an assembly consisting of an interface cable and a sensor.

- Connect the cables prior to attaching to the Monitor. An SpO_2 reading displays within moments of attaching the sensor to either an SpO_2 simulator or to your finger.
- Connect the ECG lead connector to the ECG trunk cable prior to connecting to the Monitor. The simplest way to function test the ECG circuits is through the usage of an ECG simulator.
    1. Set the simulator to normal heart rate.
    2. Set ECG amplitude to 1.5mV, BPM to 80.
    3. Set respirations to 20 RPM and the delta ohms to 1.0.
    4. Verify that the ECG waveform is displayed.
    5. Sequentially remove and reattach leads I, II, and III, and verify each time that **LEAD OFF** displays.
    6. From the ECG menu, select **turn parameter off** option.

1.3 PERIODIC MAINTENANCE

1.3.1 Required

Perform the following maintenance procedures as required.

1.3.1.1 Integrity of Hoses and Cuffs

When the pneumatic integrity of any NIBP cuff or hose is in doubt, replace the cuff and hose, and discard the questionable accessories.

1.3.1.2 Cleaning of the Monitor

CAUTION!

Do not clean Monitor with isopropyl alcohol or other solvents.

Do not immerse unit.

Wipe the exterior of the Monitor with a cloth slightly dampened with a mild detergent or normal hospital bactericides. Use dishwashing detergents such as:

IVORY® and JOY®	(registered trademarks of Procter & Gamble Corp.)
PALMOLIVE®	(registered trademark of Colgate-Palmolive Corp.).

1.3.1.3 Cleaning of Accessories

Clean the adult cuffs supplied for use with the Monitor by hand washing in warm, soapy water. However, take care to avoid entry of water into the cuff and hoses at any time. If water enters the cuff, dry the cuff by passing air through it.

The neonatal cuffs are for single patient use - discard if they become soiled.

Clean cuffs and hoses with a cloth slightly dampened with mild detergent.

Do not immerse hoses.

Do not immerse cuffs without prior application of cuff hose caps.

Clean SpO_2 sensor surface before and after each patient use. Reusable sensors can be wiped with a 70% alcohol solution. If low level subsection is required, wipe with a 1:10 bleach solution. Do not use undiluted bleach (5-5.25% sodium hypochlorite) or any other cleaning solution other than those recommended here or in the directions for use for the sensor being used. Permanent damage to the sensor could occur. Do not immerse the sensor in water or these cleaning solutions because the sensor and its connector are not liquid proof. Do not sterilize the sensor by irradiation, steam autoclave, or with ethylene oxide. Refer to directions or use for the appropriate NELLCOR® sensor.

Follow manufacturer's instructions for cleaning ECG lead wires and cable. Compatible cleaning and disinfecting solutions are dishwashing detergents such as:

- IVORY® and JOY® (registered trademarks of Procter & Gamble Corp.)
- PALMOLIVE® (registered trademark of Colgate-Palmolive Corp.).
- Chlorine bleach disinfectant, 5.25%, three-quarter cup per gallon of water.

CAUTION! **Do not apply isopropyl alcohol to the Monitor - some parts can become marred and cracked.**

- Isopropyl alcohol (for accessories only).

- Cidex Formula 7 (registered trademark of Johnson & Johnson Medical Products, Inc.) or pHisoHex (registered trademark of Winthrop-Breon Laboratories).

Quaternary-based germicidal detergents such as:

- VESTAL INSURANCE® (registered trademark of the Vestal Corp.).
- HI-TOR PLUS® (registered trademark of the Huntington Corp.).
- VIREX® (registered trademark of S.C. Johnson & Son Corp.).

For the above, follow manufacturers' recommendations for dilution rate and use. These recommendations are not an endorsement of the manufacturers or of the effectiveness of these materials for cleaning or disinfecting.

1.3.1.4 Long-Term Storage

If it becomes necessary to store the Monitor for an extended period of time, remove all attached accessories. Attach the original packing inserts, and place the Monitor into the original shipping container.

Generally, long-term storage of a nickel-metal hydride battery in either a charged or discharged condition has no permanent effect on capacity. Capacity loss due to self-discharge is reversible, and nickel-metal hydride batteries can recover to full capacity by proper recharging. For example, cycling through repeated charge/discharge cycles can restore a full capacity of a nickel-metal hydride battery that was stored at room temperature for up to one year.

Long-term storage at high temperatures can lead to deterioration of seals and separators and should be avoided.

1.3.2 Annual Procedures

Perform the test procedures described in paragraph 1.7 every twelve months, or whenever the accuracy of any reading is in doubt.

NOTE: An internal, 3.6V NiMh battery acts as an alarm backup and maintains the nonvolatile RAM memory when the Monitor is off or away from AC mains. A system alarm message is generated if backup battery replacement is required.

1.4 CARE OF STORAGE BATTERIES

The Monitor uses one nickel-metal-hydride (NiMH) storage battery. The battery can be charged at any time without reducing the charging capacity.

1.4.1 Procedures For First Use

Follow these procedures to condition a new NiMH battery and optimize its performance:

The internal battery automatically charges when the AC power supply is in use. When the battery is charged for the first time, the charger may indicate prematurely that charging is complete. This is normal and can happen with all rechargeable batteries when first charged.

1.4.2 Battery Charging

The Monitor charges the NiMH battery whenever the AC power supply is in use. The Monitor automatically senses if the battery needs recharging. Battery charging continues whenever it's needed while the Monitor is connected to the AC power supply, even when the Monitor is turned off.

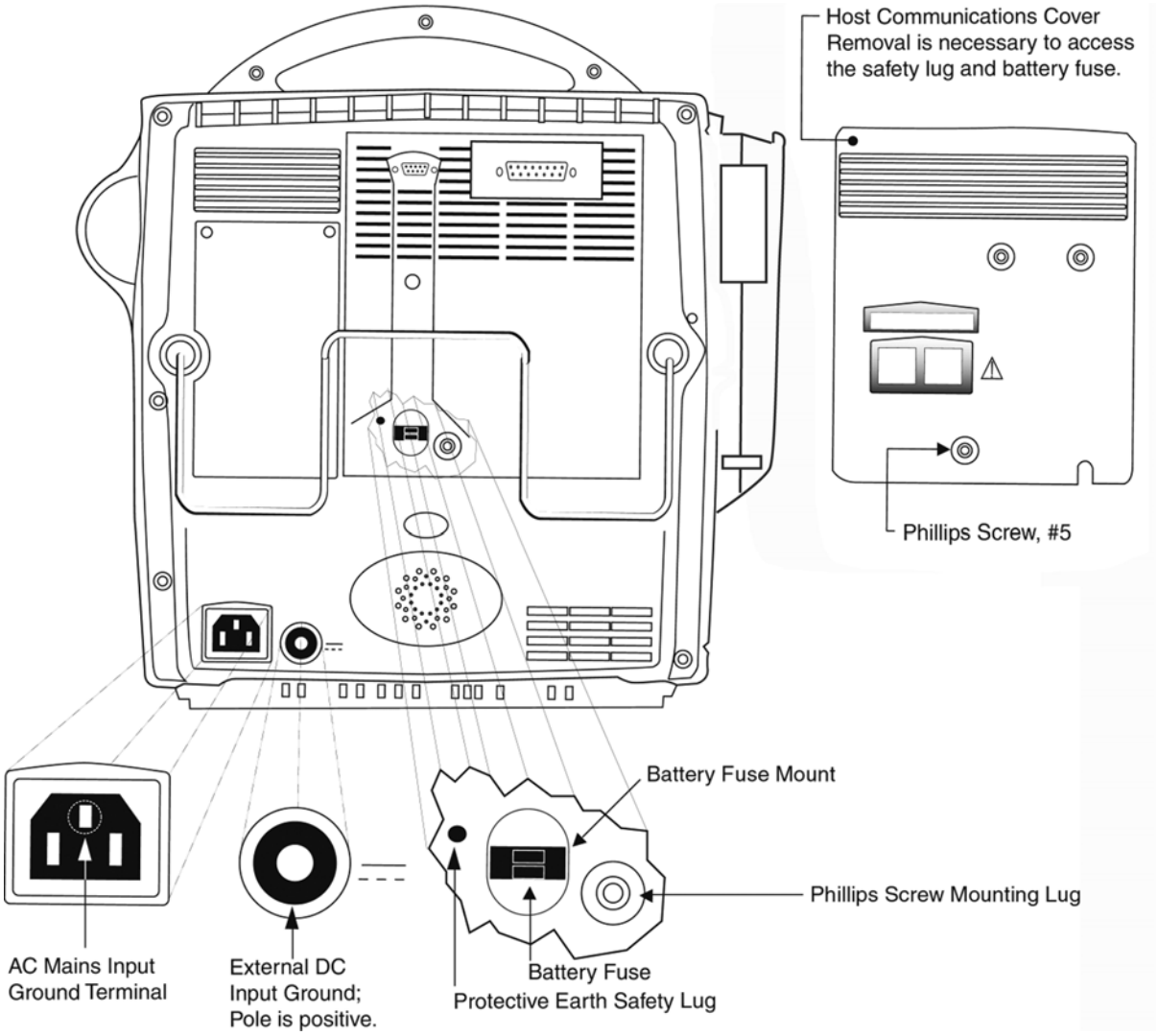
- Batteries should be charged before first use or after prolonged periods of storage.
- The battery should be charged before use, as a charged battery loses some charge when left in storage.
- The battery should be charged at room temperature (59° F - 86° F; 16° C - 30° C).
- It is normal for the battery to become warm during charging or after use.
- Batteries can be charged or topped-off at any time. It is not necessary to wait until they are fully discharged.
- If the Monitor is idle for extended periods, it should be fully charged once a month to ensure optimum performance.

1.4.3 Battery Troubleshooting

Trouble	Probable Cause	Remedy
Battery inoperative or does not last very long.	Battery not fully charged. Battery in long-term storage or nonuse.	Charge and discharge battery up to three times for optimum performance.
Battery will not charge.	Charging battery in unusually cold or hot temperatures.	Charge at basic room temperature of 59° F (16° C) to 86° F (30° C). Slowly bring battery to basic room temperature before recharging. Batteries cannot be fully charged unless internal temperatures between 57° F (15° C) and 109° F (40° C).

1.5 SAFETY

RESISTANCE TESTING Using a safety analyzer (Dynatech Nevada Model 235A or equivalent), check the ground resistance of the Monitor. Refer to the Rear View graphic for locations of test points.


Host Communications Cover Removal is necessary to access the safety lug and battery fuse.
Phillips Screw, #5
Battery Fuse Mount
Phillips Screw Mounting Lug
AC Mains Input Ground Terminal
External DC Input Ground; Pole is positive.
Battery Fuse
Protective Earth Safety Lug

Rear View of Monitor with Safety Connection Exposed

Earth-To-Secondary Continuity Verify that the resistance between the AC Mains ground pin and the External DC connector ground is less than 1Ω.

AC Mains Leakage – Normal Polarity For the following tests, 260 VAC is applied at the Monitor's AC Mains input in normal polarity.

No Fault	Verify that the leakage from line to ground pin is less than 500 μA.
Open Ground	Disconnect the Monitor's ground lead from earth ground (for the duration of this test only) and verify that the leakage from line to ground pin is less than 500 μA.
Open Neutral	Open the Monitor's neutral lead (for this test only) and verify that the leakage from line to ground is less 500 μA.
AC Mains Leakage – Reverse Polarity	For the following tests, 260 VAC is applied at the Monitor's AC Mains input in reverse polarity (inputs to line pin and Neutral pin reversed).
No Fault	Verify that the leakage from line to ground pole is less than 500 μA.
Open Ground	Disconnect the Monitor's ground lead from earth ground (for the duration of this test only) and verify that the leakage from line to ground is less than 500 μA.
Open Neutral	Open the Monitor's Neutral lead (for the duration of this test only) and verify that the leakage from line to the ground is less than 500 μA.
ECG Leakage	Using ECG probe adapter, verify that the leakage from the ECG circuit to earth ground is less than 50 μA.
Temperature Leakage	Using Temperature probe adapter, verify that the leakage from the Temperature circuit to earth ground is less than 150 μA.
SPO2 Leakage	Using SPO2 probe adapter, verify that the leakage from the SPO2 circuit to earth ground is less than 150 μA.

1.6 HI-POT TESTS

Hi-Pot testing is done on every unit at the factory and should not be repeated unnecessarily nor performed more often than required. (If unit is opened for repair, Hi-Pot testing is required otherwise hi-pot test may be exempted.)

CAUTION! High voltage will be applied to the monitor under test when the hi-pot START switch is activated.

1.6.1 AC Mains Hi-Pot

1. Set the hi-pot timer for 1 minute.
2. If not already set, set the hi-pot TEST VOLTAGE to 1.5 kilovolts AC. To set the hi-pot TEST VOLTAGE for the first time:
    a. Turn the hi-pot power switch off.
    b. Disconnect the cables from the front of the hi-pot.
    c. Shut off the timer.
    d. Push on the START switch.
    e. Adjust the TEST VOLTAGE knob until the meter reads 1.5 kilovolts AC.
    f. Push **STOP** and turn timer back on.
    g. Connect the hi-pot cables to the front of the hi-pot.
3. **Turn the hi-pot power switch off.**
4. Plug a power cord into the monitor.
5. Connect the HOT lead from the hi-pot tester to the power cord line and neutral leads.
6. Connect the GND lead from the hi-pot tester to the power cord earth ground lead.
7. **Turn the hi-pot power switch on**.
8. Momentarily raise the hi-pot START switch to start the test.
9. If the hi-pot does not alarm before the timer expires, the monitor passed the test.
10. **Turn the hi-pot power switch off**.

1.6.2 ECG / SPO2 / Temp Hi-pot

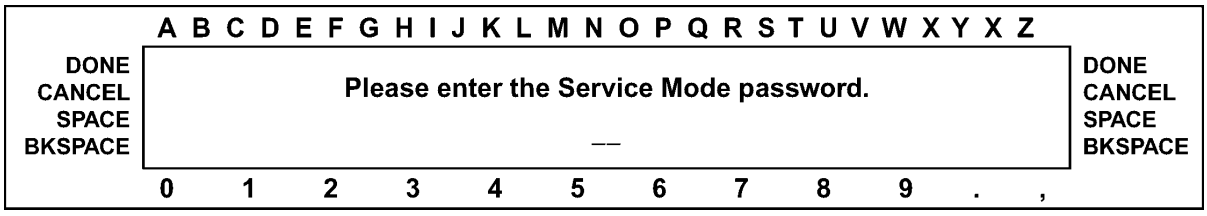
1. **Turn the hi-pot switch off**.
2. Set-up the hi-pot tester to test at 1.5 kilovolts AC for 1 minute (as in the previous test).
3. Insert the ECG, SPO2 and Temperature test adapters into the monitor under test.
4. Connect the GND hi-pot test cable to the AC MAINS cable earth ground.
5. Connect the HOT hi-pot test cable to the ECG test adapter.
6. **Turn the hi-pot power switch on**.
7. Momentarily raise the hi-pot START switch to start the test.
8. If the hi-pot does not alarm before the timer expires, the monitor passed the test.
9. Repeat steps 5 through 8 individually for the SPO2 and Temperature adaptors.

10. **Turn the hi-pot power switch off and remove hi-pot cables.**
11. Disconnect the probe adapters from the monitor under test.

1.7 SERVICE MODE OPERATION

The Monitor service mode exercises the built-in diagnostic features of the Monitor and the installed parameters. Access the service mode from a cold start by proceeding as follows:

1. Power on the Monitor using the **OFF/ON** button.
2. Use the *Select*Knob to select the ***no*** option when the Monitor prompts to admit a new patient.
3. Press or turn the *Select*Knob to access the main menu.
4. Turn the *Select*Knob to scroll down the menu. The arrow at the bottom of the list indicates that the list continues on a second screen. Highlight the **other system settings** option and press the *Select*Knob.
5. Highlight the **go to service mode** option and press the *Select*Knob. Turn the *Select*Knob and press the knob again to answer **yes** at the prompt to display the dialog box.

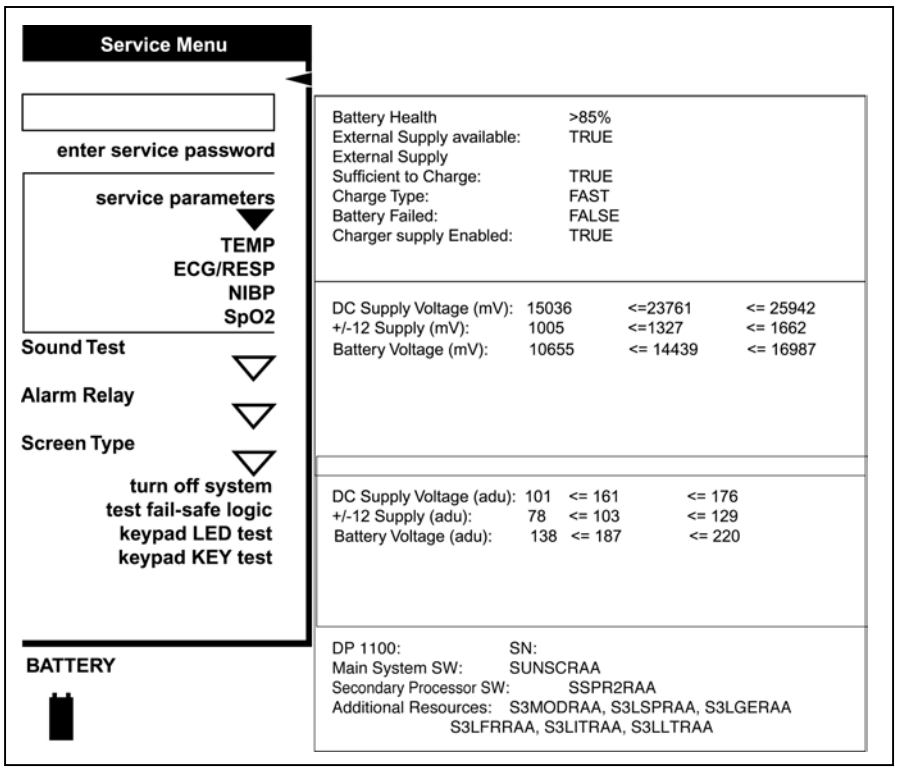

A B C D E F G H I J K L M N O P Q R S T U V W X Y X Z
DONE
CANCEL
SPACE
BKSPACE
Please enter the Service Mode password.
––
DONE
CANCEL
SPACE
BKSPACE
0 1 2 3 4 5 6 7 8 9 . ,

6. A row of numbers is displayed at the bottom of the screen. Turn the *Select*Knob and move the arrow to the desired number, then press the knob to select the number. Enter the service mode password, **2-2-1-3**.
7. After the password is selected, turn the *Select*Knob to the **DONE** option and press the knob.
8. In the process of entering the Service Mode, the Monitor resets itself. Successful entry into

the Service Mode is indicated by the Service Menu title displayed on the upper left side of the display.

NOTE: The service mode can also be entered directly from a cold start by pressing and holding the following two keys until full power-up: OFF/ON and AUTO-BP. To make any changes to the Service Menu, the password has to be entered: press the *Select*Knob to **enter service password.**

9. At this point the Service Mode main screen should be present in the main display, as shown below. The service menu **service parameters** area displays a list that corresponds to the number and type of parameters that have been detected by the Monitor. If the service mode was entered directly (as described in the NOTE above), **enter service password** appears above the service parameters on the service menu. The password MUST be entered (as described in Steps 5 and 6) before any changes to calibration can be made.



Main Service Menu

For each parameter, there are one or more service screens that display operating values and tests that are applicable to the parameter type. Refer to the following paragraphs for information about each parameter. At the conclusion of the tests, select **go to service menu** at the top of the screen to return to the Service Menu main screen.

NOTE: Additional resources depend on the configuration of the Monitor.

1.7.1 SpO_2 Tests

1.7.1.1 For Monitors With Nellcor SpO_2:

On occasion when testing the integrity of the Nellcor oximetry system, abnormal results may occur when introducing large changes in the pulse rate and/or pulse amplitude. Extreme changes in rate sent to the Nellcor sensor by the SpO_2 may cause the SpO_2 algorithm to completely miss finding the pulse rate.

This is an expected result. To work around this, incrementally step up or down the settings on your SpO_2 simulator and allow the monitor to detect and display the new pulse rate or saturation.

Nellcor recommends use of the SRC-MAX Portable Tester for use with PRO Monitors equipped with the Nellcor SpO_2 system.

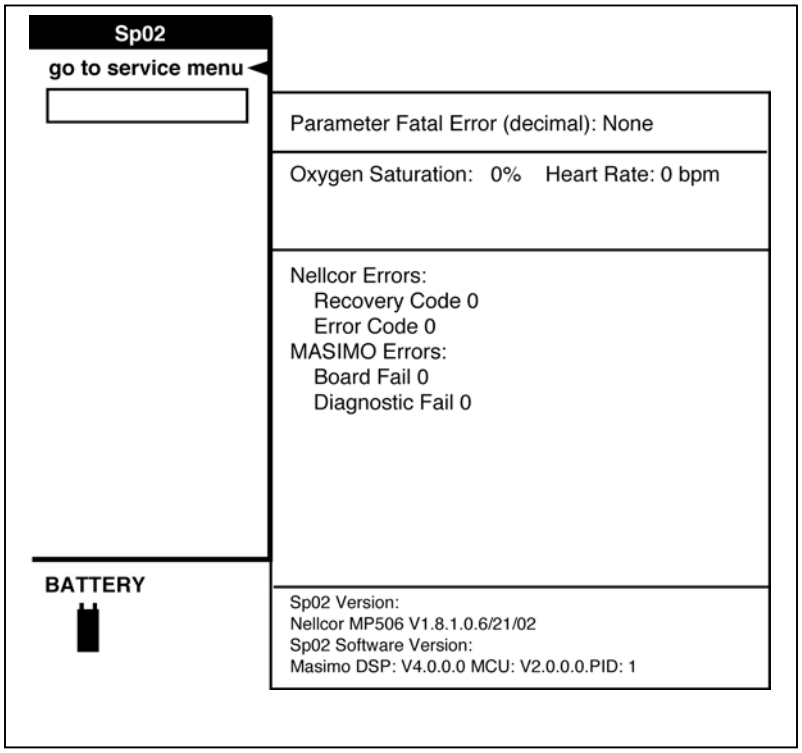
1.7.1.1 For Monitors With Masimo SpO_2:

Masimo recommends BIO-TEK SpO_2 simulators.

Test Procedure:

1. Disconnect all sensor cables from the SpO_2 Parameter, and ensure that the SpO_2 parameter is listed within the main Service Menu.

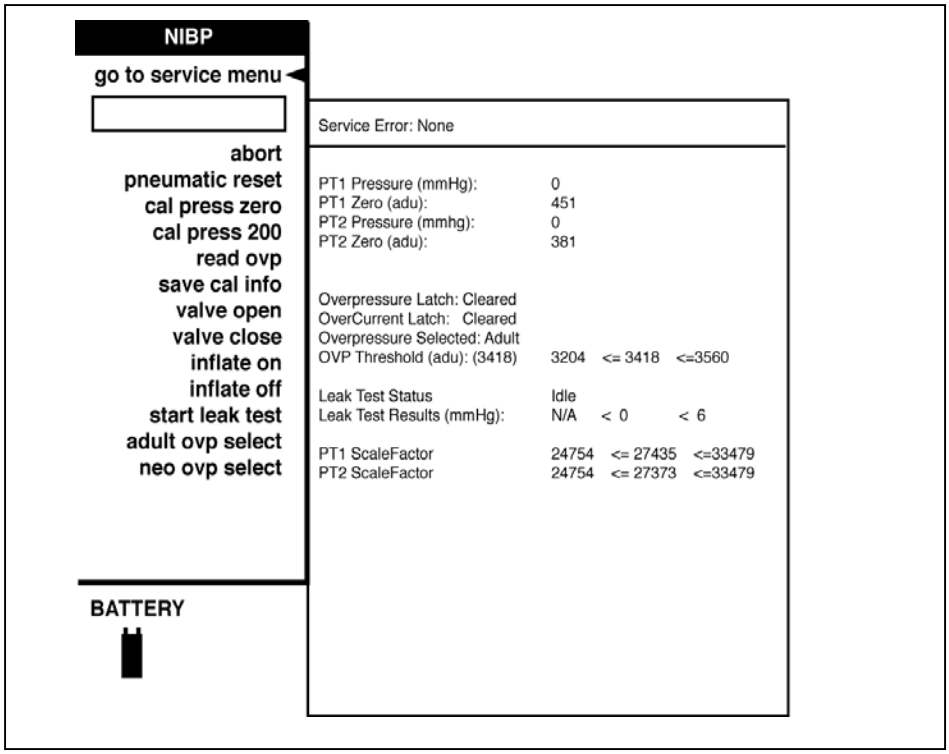
2. From the Service Menu, turn and press the *Select*Knob to select the SpO_2 service parameter. The SpO_2 service menu displays. The text under Error and Version sections reflects the installed type of SpO_2. The illustration shows both text examples.



SpO_2 Service Menu

3. All SpO_2 mode operations take place with Masimo and Nellcor power-up defaults. No menu settings are reflected.
4. Connect the appropriate SpO_2 simulator and cable to the side interface panel SpO_2 connector. Be sure it is fully seated in the socket.
5. Set simulator for 98% saturation and 80BPM. Verify that the Monitor responds accordingly by displaying the proper heart rate value and saturation value.

1.7.2 NIBP Tests



NIBP Service Menu

Perform the following tests to determine that the NIBP parameter is functioning normally.

1.7.2.1 Leak Test

CAUTION!

Calibration equipment should always be kept dry and free of particulate matter. Moisture or foreign substances introduced to the pneumatic system will likely cause damage to the Monitor and/or accessories.

Inspection of pneumatic hose O-rings is recommended once a year.

1. Using the calibration kit (part number 320-246), an adult cuff and air hose, and a manometer, set up the equipment as shown in Figure 1-1. Connect the hose to the NIBP Parameter. Make sure that all of the fittings are tight, and that the valve on the manual inflation bulb is fully closed.

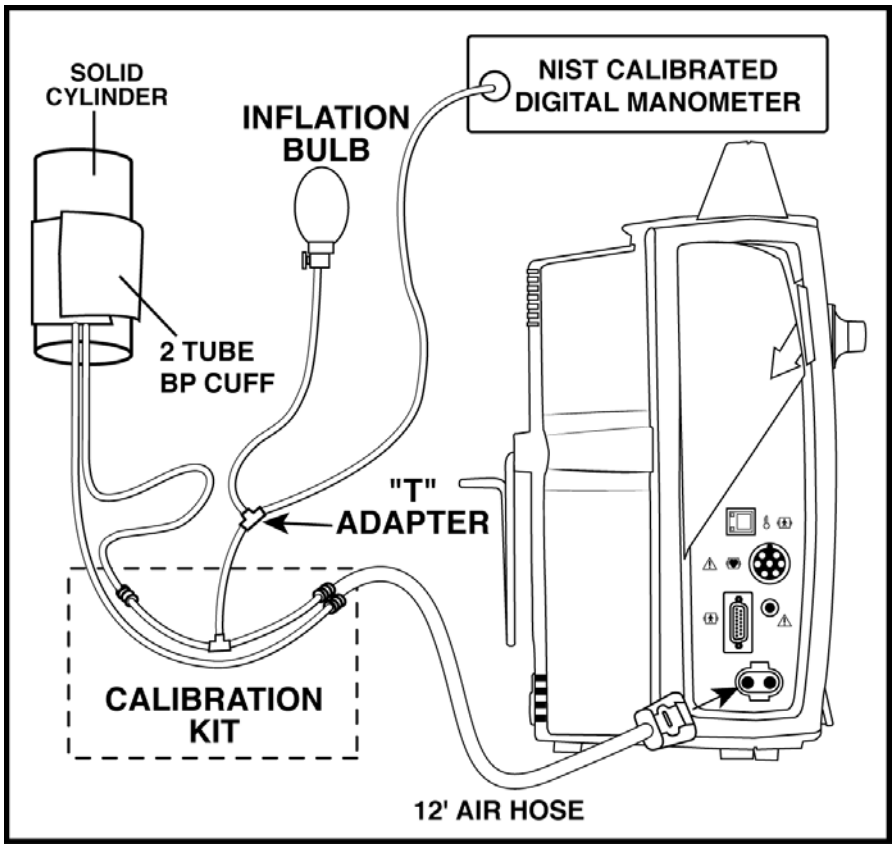


Figure 1-1. NIBP Test Setup

2. From the Service Menu, turn and press the *Select*Knob to select the **NIBP** service parameter.
3. Turn and press the *Select*Knob to select **start leak test**. Observe that the **Leak Test Status** message on the menu indicates **Busy**.
4. Observe that the pump begins inflating the system to 200 ~ 210 mmHg, at which point the pump operation will cease. The Monitor will begin to calculate system pressure loss rate.
5. After about 60 seconds, the pressure is released, and the menu should display **Leak Test Status Passed**, and the **Leak Test Results** indication should be a value less than 6. **Service Error: None** should continue to display.
6. If the menu displays **Leak Test Failed**, continue to Step 9.
7. Using the calibration kit (part number 320-246), an adult cuff and air hose, and a manometer, set up the equipment as shown in Figure 1-2.

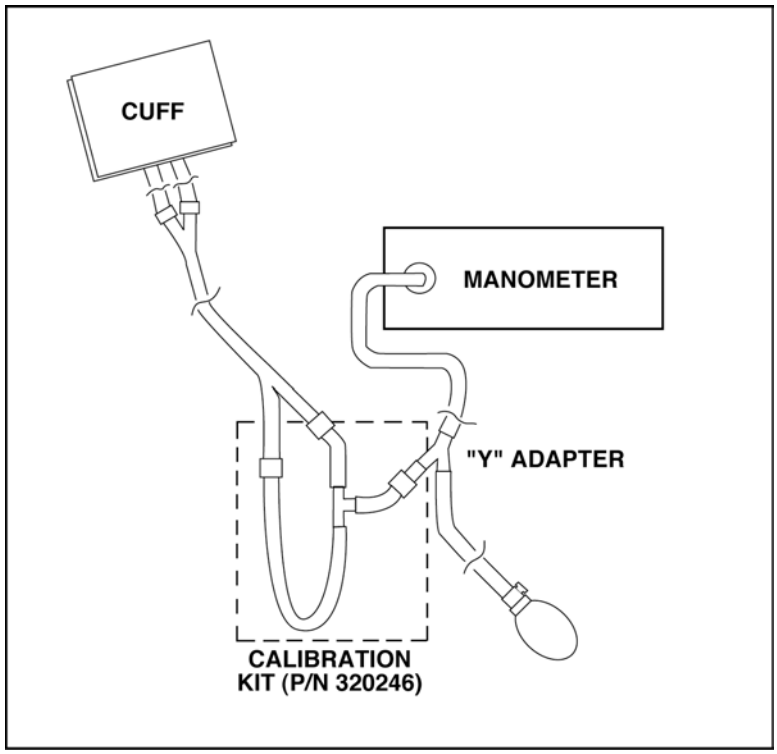


Figure 1-2 Leak Test Setup

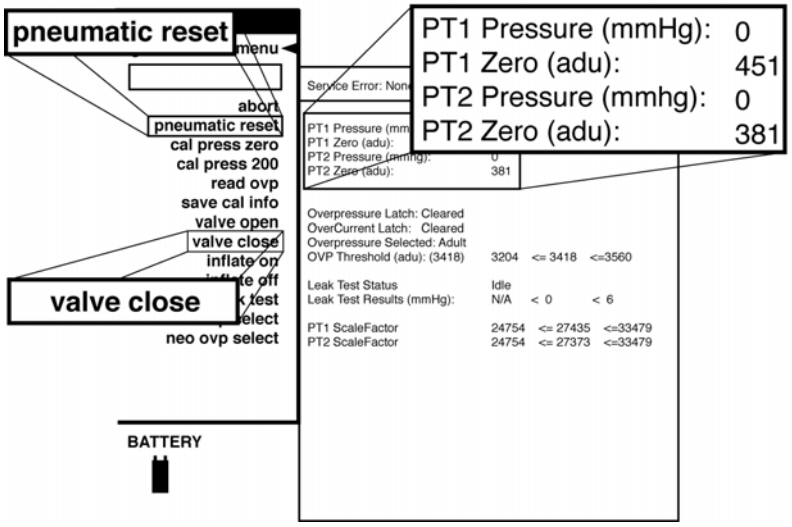
8. Close the pressure release valve on the manometer inflation bulb and slowly increase the pressure to 200-mmHg ±1 mmHg.
9. Verify the pressure indicated on the manometer remains within 5 mmHg of 200 mmHg for 60 seconds. If not, either the cuff or hose or both may be defective. If the cuff and hose pass this test, repeat Steps 1 through 7 to try to isolate the leak. Repeat the leak test for all cuff and hose combinations to be used with the Monitor.

CAUTION!

Calibration equipment should always be kept dry and free of particulate matter. Moisture or foreign substances introduced to the pneumatic system will likely cause damage to the Monitor and/or accessories.

1.7.2.2 NIBP Calibration Check

1. Using the calibration kit (part number 320-246), an adult cuff and air hose, and a manometer, set up the equipment as shown in Figure 1-1. Connect the hose to the NIBP Parameter. Make sure all fittings are tight, and that the inflation bulb valve is closed tightly.



NIBP Service Menu

2. From the Service Menu, turn and press the *Select*Knob to select the **NIBP** service parameter.

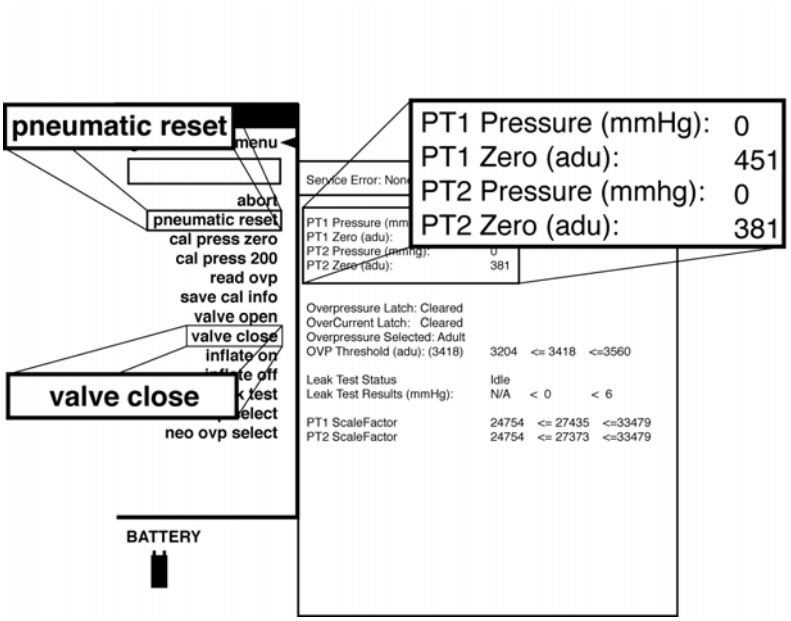
3. Turn and press the *Select*Knob to select **pneumatic reset**.
4. Turn and press the *Select*Knob to select **valve close**.
5. Observe that both **PT1 Pressure** and **PT2 Pressure** equal initial values of zero mmHg **(0 mmHg)**.
6. Connect the pneumatic hose to the Monitor's NIBP port.
7. Fold the adult cuff so the index line is aligned with the inner range mark on the inside of the cuff. Make sure all fittings are tight, and that the valve on the inflation bulb is closed tightly. If there is doubt about the integrity of the system, perform the leak test (paragraph 1.7.2.1) before continuing.
8. Close the pressure release valve on the manometer inflation bulb and manually pump up the pressure until the manometer indicates approximately 220 mmHg.
9. Allow the pressure to stabilize for at least one minute. Then open the pressure release valve on the manometer inflation bulb and carefully bleed off pressure until the manometer indicates 200 mmHg.
10. Observe that the values of **PT1 Pressure** and **PT2 Pressure** on the menu indicate within 1 mmHg of the pressure shown on the manometer.
11. Verify the system linearity by repeating steps 8 & 9 using manometer readings of 250 mmHg, 150 mmHg, and 50 mmHg. Observe that the **PT1** and **PT2 Pressures** are within 3 mmHg of manometer readings for each of these pressure indications. If not, proceed to paragraph 1.7.2.3.

1.7.2.3 Pressure Recalibration

CAUTION! Calibration equipment should always be kept dry and free of particulate matter. Moisture or foreign substances introduced to the pneumatic system will likely cause damage to the Monitor and/or accessories.

1. Always enter Service Mode with the password, as described in paragraph 1.7, before attempting to recalibrate equipment.

2. Using the calibration kit (part number 320-246), an adult cuff and air hose, and a manometer, set up the equipment as shown in Figure 1-1. Do not connect the pneumatic hose to the NIBP port yet.
3. From the Service Menu, Turn and press the *Select*Knob to select the **NIBP** service parameter.



NIBP Service Menu

4. Turn and press the *Select*Knob to select **pneumatic reset**.
5. Turn and press the *Select*Knob to select **valve close**.
6. Observe that both **PT1 Pressure** and **PT2 Pressure** display initial values of **0** on the menu.
7. Turn and press the *Select*Knob to select **cal press zero**. Observe that the message **Inflate System to 200 mmHg Then Hit 'Cal Press 200'** is displayed on menu.
8. Connect hose to NIBP Parameter.
9. Fold the adult cuff so the index line is aligned with the inner range mark on the inside of the cuff. Make sure all fittings are tight, and that valve on inflation bulb is closed tightly. If there is doubt about the integrity of the system, perform the leak test (paragraph 1.7.2.1) before continuing.
10. Close the pressure release valve on the manometer inflation bulb and manually pump up

the pressure until the manometer indicates approximately 220 mmHg.

11. Allow the pressure to stabilize for at least a minute. Then open the pressure release valve on the manometer inflation bulb and carefully bleed off pressure until the manometer indicates a little more than 200 mmHg.
12. Turn and press the *Select*Knob to select **cal press 200**, but do not press the knob.
13. When the manometer indicates exactly 200 mmHg, press the Rotor. Observe that system pressure is released, and the message: **!!!!! CAL INFO NOT SAVED!!!!!** is displayed on menu.
14. Turn and press the *Select*Knob to select **save cal info**. If the system is operating normally, the menu displays **Service Error: None**, and the calibration setting is saved.
15. Repeat the calibration check procedure (paragraph 1.7.2.2) to confirm the calibration setting.

1.7.2.4 Overpressure Tests

CAUTION! Calibration equipment should always be kept dry and free of particulate matter. Moisture or foreign substances introduced to the pneumatic system will likely cause damage to the Monitor and/or accessories.

1. Using the calibration kit (part number 320-246), an adult cuff and air hose, and a manometer, set up the equipment as shown in Figure 1-1. Connect the hose to the NIBP Parameter. Make sure all fittings are tight, and that valve on inflation bulb is closed tightly.
2. From the Service Menu, Turn and press the *Select*Knob to select the **NIBP** service parameter.
3. Turn and press the *Select*Knob to select **pneumatic reset**.
4. Turn and press the *Select*Knob to select **valve close**.
5. Observe that the menu displays **Overpressure Selected Adult**. If not, turn and press the *Select*Knob to select **adult ovp select**.
6. Turn and press the *Select*Knob to select **inflate on**. The pump should begin to inflate the system.

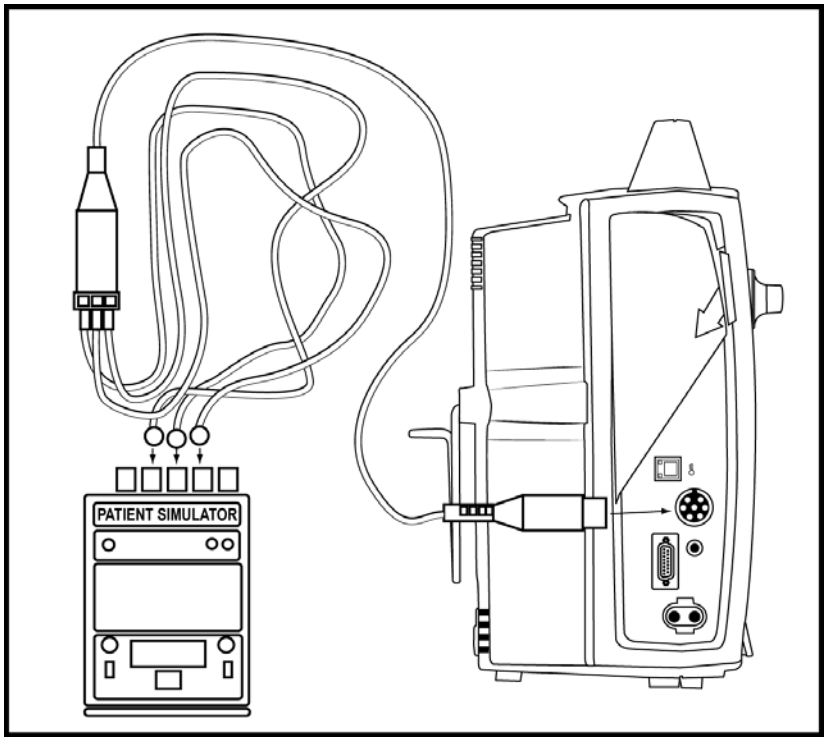
7. Watch the pressure indication increase on the manometer, and observe that the pump is shut down and the pressure is released when the manometer indicates in the range of 300 to 330 mmHg. Observe that the menu displays **Service Error: None**.
8. Turn and press the *Select*Knob to select **pneumatic reset**.
9. Turn and press the *Select*Knob to select **valve close**.
10. Turn and press the *Select*Knob to select **neo ovp select**. Observe that the menu displays **Overpressure Selected Neo**.
11. Turn and press the *Select*Knob to select **inflate on**. The pump should begin to inflate the system.
12. Watch the pressure indication increase on the manometer, and observe that the pump is shut down and the pressure is released when the manometer indicates in the range of 150 to 165 mmHg. Observe that the menu displays **Service Error: None**.
13. If the overpressure test results in an "out of tolerance" condition, contact GE Medical Systems *Information Technologies* at 877-274-8456 for assistance.

1.7.3 ECG Tests

Connect the ECG leads to the ECG trunk cable prior to connection to the Monitor. The simplest way to function test the ECG circuitry is through the usage of an ECG simulator with the Monitor in normal monitoring mode.

1. Set ECG simulator to 80BPM Paced.
2. Set ECG simulator amplitude to 1.0mV
3. Press **ON/OFF** button to power up UUT.
4. Select **no** at new patient prompt. Set the ECG high alarm to **150** and the low alarm to **50**.
5. Verify that the ECG waveform is displayed on LCD display.
6. From ECG menu, select **Pace 1** and verify paced marker on display waveform.
7. From ECG menu, select **Pace 2** and verify paced marker on display waveform.
8. From ECG menu, select **pace detection off**. Turn paced off on simulator.

9. After unit has learned the patient waveform change the BPM to 30.
10. Verify “HR LOW” alarm with HR 30 ±4 on unit.
11. Set ECG simulator to 160BPM
12. Verify that the ECG waveform is displayed on the LCD display.
13. Verify “HR HIGH” alarm with HR 160 ± 4 on unit.
14. Set ECG simulator to 80 BPM.
15. Set ECG high alarm to **200** and low alarm to **10**.
16. Set ECG simulator to VTACH.
17. Verify “ECG VTACH” alarm and HR is 180 ± 4.
18. Set ECG simulator to 80 BPM
19. Press **silence** hardkey to acknowledge the alarm and verify HR is 80 ± 4.
20. Connect scope to analog output using 1/8” stereo plug (+ to ring, - to shield).
21. Verify that the ECG waveform is displayed on the scope (amplitude approximately 1V).
22. Disconnect scope from analog output.
23. Remove and reattach leads I, II, III, sequentially and verify “ECG LEAD FAIL” alarm on display.
24. From ECG menu, select **turn parameter off**.



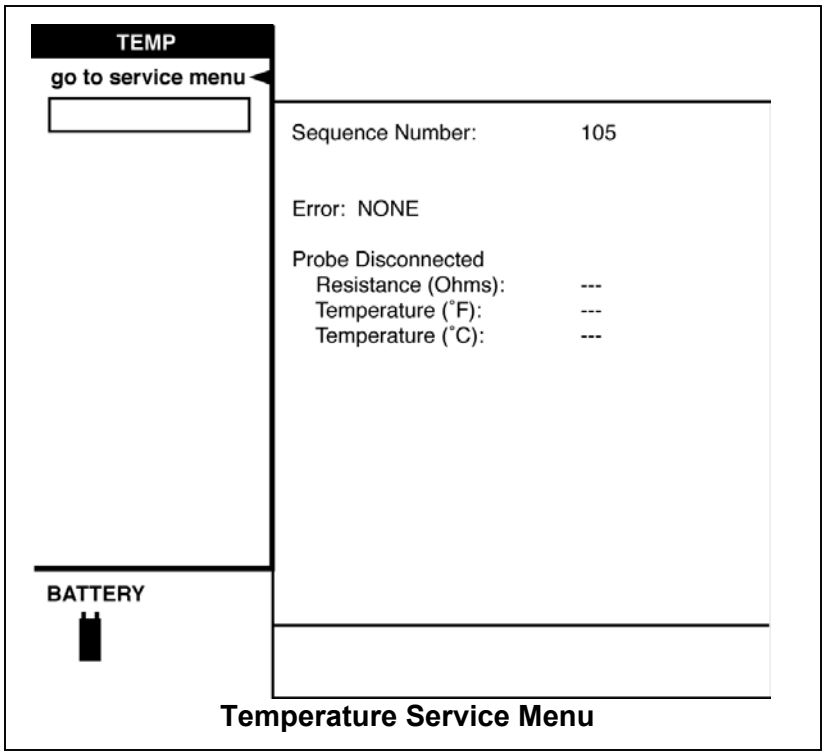
1.7.4 RESP Test

1. Set simulator Respiration to 20 BrPM .
2. Set simulator delta ohms to 1.0.
3. Set simulator Baseline to 1K, and Lead to II.
4. Verify that the RESP waveform is displayed on the LCD display
5. Record and verify the UUT RESP reading.
6. Set simulator Respiration to 60 BrPM.
7. Record and verify the UUT RESP reading.
8. From RESP menu, select turn **parameter off**.

1.7.5 TEMP Tests (if fitted)

The Pro1000 temperature system uses ALARIS Model 2885 and 2886 temperature probes. This system is self-calibrating. The only maintenance required is to verify that the temperature functions work properly. These checks require an IVAC probe simulator (P/N TE 1811), available from ALARIS Medical Systems, Inc., San Diego, CA. (619) 458-7000. GE Medical Systems *Information Technologies* does not stock this tester.

1. Disconnect any temperature probe from the IVAC temperature connector.
2. From the Service Menu, turn and press the *Select*Knob to select the **TEMP** service parameter. The TEMP service menu displays as shown below.
3. To check the temperature system, connect the IVAC probe simulator to the temperature probe connector on the side interface panel and insert a temperature probe into the holster.
4. Set the probe simulator to 98.6, verify and record the displayed temperature is 98.6^{o}F +/-0.2^{o}F. Set the probe simulator for the other values(80.2 and 107.8) and verify and record the displayed temperatures.



Temperature Service Menu

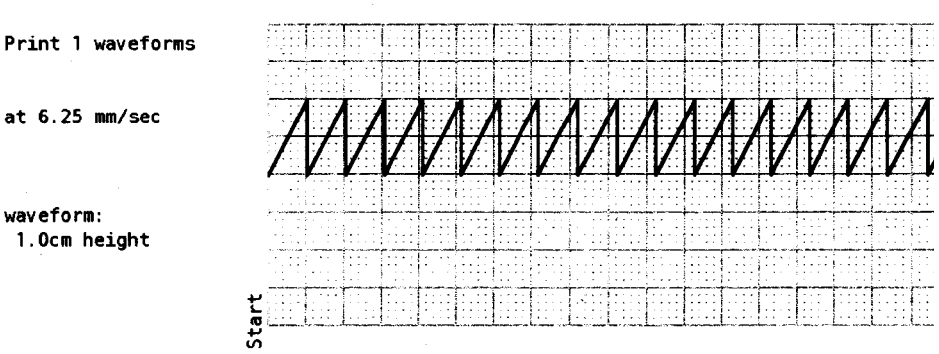
5. Set the probe simulator to B.P. Verify the temperature displayed is 106.0+/-0.2°F and Probe indication is IN. Press the broken probe button and verify the monitor displays “Probe Disconnected”.
6. Set simulator for both Oral and Rectal and verify the correct probe type is indicated.
7. Remove and insert probe from holster and verify probe IN/OUT detection.

Calibration verification is complete. Disconnect the probe simulator and install the temperature probe. If the Monitor does not pass the calibration verification then contact customer service.

1.7.6 RECORDER Tests

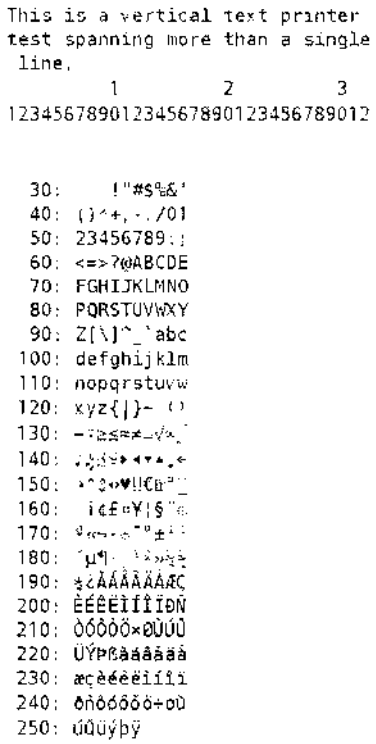
1. Ensure that paper has been loaded into the Recorder Parameter, and you are presently in the Service Mode.
2. From the Service Menu, turn and press the *Select*Knob to select the **RECORDER** test option. Turn and press the *Select*Knob to choose the **Print 1 Waveforms** option. Turn and press the *Select*Knob to choose the **Wave Test 6.25mm/S**

option. Verify that all printouts are of even tone and all pixels are present.



Sample 6.25 mm/sec – 1 waveform chosen

3. Allow for the paper to spool out a 12 inch printed section then press **Stop Test**.
4. Select **Vertical Text** test. Verify that the printed text is legible and evenly spaced.



Vertical Text printout

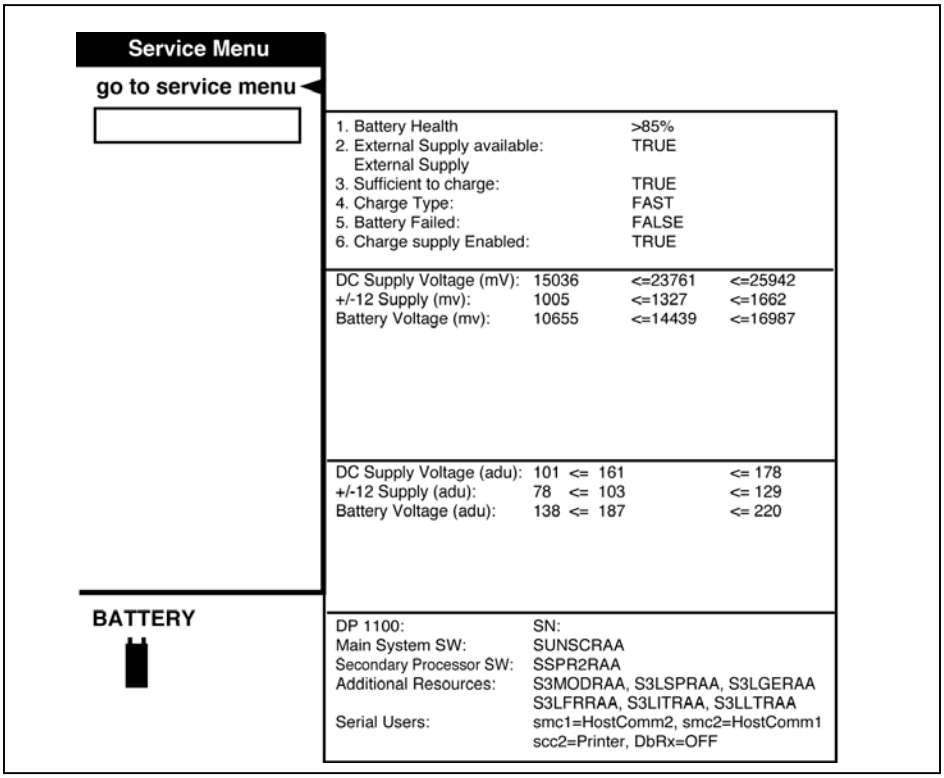
5. Select Horizontal Text test. Verify that the printed text is legible and evenly spaced.

```
Horizontal

     Printer

   Test


1       9
 2     8 10
  3   7   11
   4 6     12
    5
```

Horizontal Text Test Printout

1.7.7 Battery Tests

From within the Service Menu, battery status information is displayed on the upper right-hand section of the display.


Service Menu
go to service menu
1. Battery Health >85%
2. External Supply available: TRUE
External Supply
3. Sufficient to charge: TRUE
4. Charge Type: FAST
5. Battery Failed: FALSE
6. Charge supply Enabled: TRUE
DC Supply Voltage (mV): 15036 <=23761 <=25942
+/-12 Supply (mv): 1005 <=1327 <=1662
Battery Voltage (mv): 10655 <=14439 <=16987
DC Supply Voltage (adu): 101 <= 161 <= 178
+/-12 Supply (adu): 78 <= 103 <= 129
Battery Voltage (adu): 138 <= 187 <= 220
BATTERY
DP 1100: SN:
Main System SW: SUNSCRAA
Secondary Processor SW: SSPR2RAA
Additional Resources: S3MODRAA, S3LSPRAA, S3LGERAA
S3LFRRAA, S3LITRAA, S3LLTRAA
Serial Users: smc1=HostComm2, smc2=HostComm1
scc2=Printer, DbRx=OFF

Battery/ Power Supply menu

Battery Health: the Monitor's software approximates the true status of the battery's health. The value indicated is displayed as both a number (in percentage) and as an icon on the bottom-left area of the display.

External Supply available: True indicates a source other than the internal battery is providing power for the Monitor, and a source to charge the internal battery.

External Supply Sufficient to Charge: If the voltage from the external supply is greater than that of the internal battery, the Monitor will display the results as TRUE. False will result if either the voltage is equal to or lower than the power available from the internal battery.

Charge Type: Fast or Slow.

Battery Failed: Any result other than FALSE, indicates that the internal battery has suffered a failure and should be investigated.

Charger Supply Enabled: Should always be TRUE as the Monitor consistently attempts to keep the battery at its' fullest capacity. A FALSE indicates the battery may be faulty or not installed, or the charge circuit may have failed. Also, if no external source of power is available, the Monitor registers a FALSE result.

1.7.7.1 Test Procedure:

1. Verify AC Mains indicator on front panel of unit near **OFF/ON** button is lit with AC Mains plugged in.
2. Turn on Monitor.
3. Remove AC Mains and verify uninterrupted battery operation.
   Note: If this fails check fuse in communications well.
4. Verify battery indicator is lit near **OFF/ON** button.

Note: Battery life is dependent upon battery usage. A fully charged battery should last 120 minutes (+/- 10 min) using the following setup:

(NIBP: 5-min auto cycle with adult cuff. ECG, RESP, SpO2: Active. TEMP: predictive mode. Printer: printing 2 waveforms for 1 min every 20 min at 25 mm/sec.).

1.7.8 Failsafe Logic Test

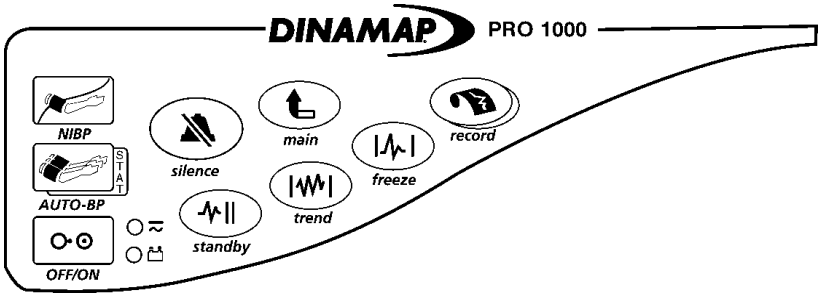
1. From the Service Menu, turn the *Select*Knob to select **test fail-safe logic**. A dialogue box displays:

CAUTION!	This causes the system to freeze for approximately 2 seconds then enter the fail-safe mode. Continue?

   1. Turn the *Select*Knob to the **yes** option and press the knob.
   2. After two seconds, the system freezes, an alarm sounds, and the screen goes blank. Recycle the system power using the OFF/ON button. To return to the Service Mode, repeat the procedures as described in Section 1.7.

1.7.9 Keypad LED Test

1. From the Service Menu, rotate and press the *Select*Knob to select **keypad LED test**. Observe that each of the keys on the Monitor face, illuminate one key at a time. With the exception of the **OFF/ON** key, observe whether or not any of the keys fail to illuminate.



2. After all keys have been tested, press the *Select*Knob again to stop the test.

1.7.10 Keypad KEY Test

1. From the Service Menu, rotate and press the *Select*Knob to select **keypad KEY test**. With the

exception of the **OFF/ON** key, observe that each key press toggles the key LED color and produces a beep tone.
2. After all keys have been tested, press the *Select*Knob again to stop the test.

1.7.11 Sound Test Verify that the Monitor produces tones of various pitches when this option is selected.

1.7.12 Communications Tests

1.7.12.1 Set up Terminal

1. Connect serial communication cable from PC to rear of UUT (DB15).
2. Invoke terminal program with settings:
   9600 baud,
   No parity,
   8 bits,
   1 stop bit,
   flow = xon/xoff ,
   no cr/lf character enabled

Note: Terminal must be set to an available communication port (comm1 is default) or redirect the terminal program to an appropriate port.

1.7.12.2 Configure UUT for Communication

1. Rotate the rotor to get to the Main menu and select **other system settings**.
2. Select **go to config** mode, select **yes** at the verification prompt.
3. Enter password 2508, and select **done**.
4. After the unit reboots, rotate the rotor to display the Configuration Menu.
5. Select **other system settings**, then **Config HostComm**.
6. Configure the COMMS port for Remote access Serial 2.
7. Select **Serial 2 setup** and configure Serial 2 for ASCII cmd, 9600 baud.
8. Select **go to previous menu**, then **save default changes**.
9. Select **exit config mode**, select **yes** at the verification prompt.
10. After the unit reboots, select **no** at “new patient” prompt.

1.7.12.3 Communication Test

1. Execute the following commands (by sending text files from the terminal program) and verify the appropriate response.
   Note: each string is preceded by a space. "∧" represents the space character.
   "∧NC0!E" Verify that UUT pump starts.
   "∧ND!5" Verify that UUT pump stops.
   "∧TB!9" Verify return temperature status in the form "…TB-99999…".

1.7.13 Remote Alarm Test

1. Install test plug assembly to DMM which inserts a 470Ω resistor across DMM terminals.
2. Use the DMM to measure voltage between pins 4 and 8 of DB15 connector (see Figure 5) and record the result.
3. Select *Alarm relay / ON*.
4. Measure and record voltage between pins 4 and 8 of DB15 connector.
5. Select *Alarm relay / OFF*.
6. Remove test plug assembly from DMM.

1.7.14 Turn off system

Selection of this menu item brings up a dialogue window requesting you to confirm your decision:

CAUTION!	This turns the system off. Are you sure you want to do this?

Selecting **yes** powers off the Monitor. Selecting **no** returns the Monitor to the Service Menu.

1.8 SERVICE MODE EXIT

To exit the service mode and power off the Monitor, locate and press the key marked OFF/ON at the front of the Monitor.

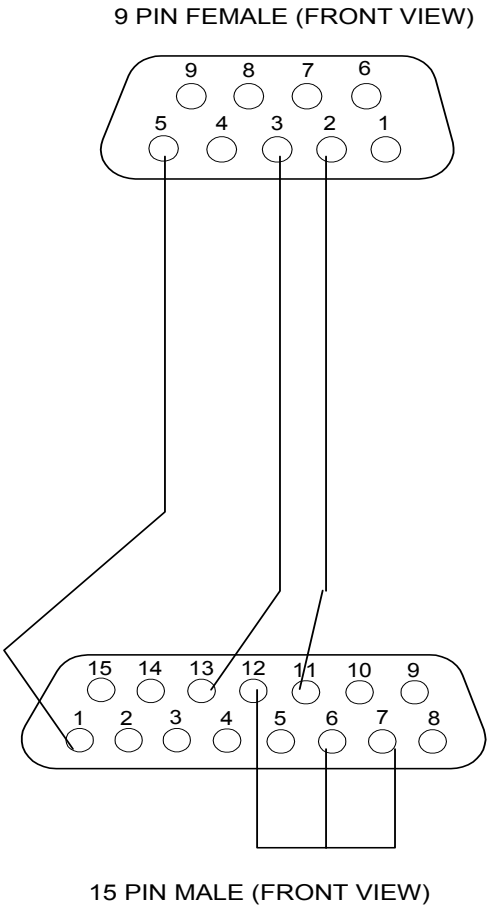


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Figure 1-3. SERIAL COMMUNICATION CABLE

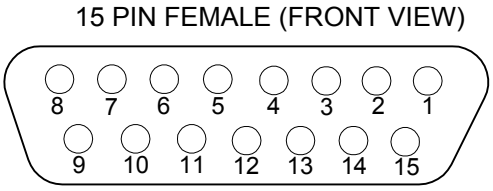

Figure 1-4. DB15 REAR PANEL CONNECTOR

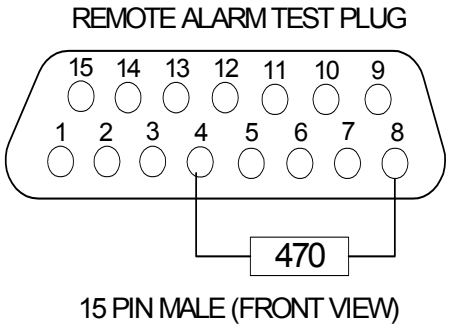

Figure 1-5. TEST PLUG ASSEMBLY

APPENDIX A:
Test Record

Model# _____

TEST RECORD

Serial#_____.

Step	Description	Min	Max	Actual	Pass	Fail	N/A
Safety Testing							
4.5	External DC to GND Resistance (m□)	0	1000				
4.5	Normal no-fault leakage (µA)	0	500				
4.5	Normal open-ground leakage (µA)	0	500				
4.5	Normal open-neutral leakage (µA)	0	500				
4.5	Reverse no-fault leakage (µA)	0	500				
4.5	Reverse open-ground leakage (µA)	0	500				
4.5	Reverse open-neutral leakage (µA)	0	500				
4.5	ECG leakage (µA)	0	50				
4.5	Temp Leakage (µA)	0	150				
4.5	SPO2 Leakage (µA)	0	150				
Hi-Pot Testing							
4.6.1	AC Main Hipot (mA)	0	2.5				
4.6.2	ECG (mA)	0	1				
4.6.2	SPO2 (mA)	0	1.5				
4.6.2	Temp (mA)	0	1.5				
SpO_2 Testing							
4.7.1	SpO_2 reading at 98% Saturation	96	100				
4.7.1	BPM reading at 80BPM	76	84				
NIBP Testing (Perform in Service Mode)							
4.7.2.1	Leakage Test						
4.7.2.2	UUT Pressure - 50 mmHg	47	53				
4.7.2.2	UUT Pressure - 150 mmHg	147	153				
4.7.2.2	UUT Pressure - 250 mmHg	247	253				
4.7.2.4	Verify adult overpressure occurs between 300~330 mmHg						
4.7.2.4	Verify neo overpressure occurs between 150~165 mmHg						
4.7.2	Initial cuff inflation (Adult cuff)	161	195				
4.7.2	Systolic Reading (120/80 Adult)	107	133				
4.7.2	Diastolic Reading (120/80 Adult)	67	93				
4.7.2	Heart Rate reading @ 80 BPM (NIBP)	76	84				
4.7.2	Inflate/ Deflate cycle time <120 seconds						
4.7.2	Initial cuff inflation (Neonatal cuff)	94	151				
4.7.2	Systolic Reading (100/65 Neonatal)	87	123				
4.7.2	Diastolic Reading (100/65 Neonatal)	52	78				
ECG Testing (Perform in Monitor Mode)							
4.7.3	Verify Waveform						
4.7.3	Verify paced 1 marker on ECG signal						
4.7.3	Verify paced 2 marker on ECG signal						

4.7.3	Verify HR LOW alarm and BPM at 30	26	34				
4.7.3	Verify HR HIGH alarm and BPM at 160	156	164				
4.7.3	Verify ECG VTACH alarm and BPM at 180	176	184				
4.7.3	Verify ECG LEAD FAIL alarm						
RESP Testing (Perform in Monitor Mode)							
4.7.4	Verify Waveform						
4.7.4	Verify RESP (@ 20 BPM)	17	23				
4.7.4	Verify RESP (@ 60 RPM)	57	63				
4.7.4	Verify Waveform						
4.7.4	Verify RESP (@ 20 BPM)	17	23				
4.7.4	Verify RESP (@ 60 RPM)	57	63				
Temperature Testing (Perform in Service or Monitor Mode - requires Alaris Temp Simulator)							
4.7.5	Measured Temp in ºF (98.6º nominal)	98.4	98.8				
4.7.5	Measured Temp in ºF (80.2º nominal)	79.9	80.5				
4.7.5	Measured Temp in ºF (107.8º nominal)	107.5	108.1				
4.7.5	Probe Disconnected						
4.7.5	Probe Type						
4.7.5	Probe In/Out Detect						
Recorder Testing							
4.7.6	Recorder Test						
Battery System Testing (Perform in Monitor Mode)							
4.7.7	Verify AC Mains Indicator						
4.7.7	Remove AC, Verify uninterrupted battery operation						
4.7.7	Verify Battery LED is lit						
Failsafe Logic Testing							
4.7.8	Failsafe Logic						
Front Panel LED Testing							
4.7.9	Keypad LED Test						
Front Panel Key Testing (Perform in Service Mode)							
4.7.10	Verify appropriate responses to key presses						
Sound Test							
4.7.11	Speaker Test						
Communications Testing							
4.7.12	Verify pump starts, stops and temp status returns						
Remote Alarm Test							
4.7.13	Voltage between pins 4 and 8, alarm inactive	4.7	5.3				
4.7.13	Voltage between pins 4 and 8, alarm active	0.0	0.1				

Tested by:	**Date:**
Signature:	**Facility:**

APPENDIX B:
Monitor Configuration Log

MONITOR CONFIGURATION LOG - Appendix B

DINAMAP PRO 1000 Monitor

Note: Please refer to the PRO 1000 Pre-Service and Calibration Procedures for instructions.

Date: _____ City: _____

Hospital: _____

Serial Numbers:

_____ _____ _____ _____

_____ _____ _____ _____

_____ _____ _____ _____

How to Enter Configuration Mode

1. Choose **other system settings** from the **Main** Menu.
2. Choose **go to config mode**. The message **This will initiate the sequence for entering Configuration Mode. Do you want to do this?** appears.
3. Choose **Yes** to enter configuration mode.
4. The message **Please enter the Config Mode** password appears. Enter the password. FACTORY SET CONFIG PASSWORD: **2508**
5. Choose **Done**.
6. The system will restart in configuration mode. Press the SelectKnob to access the **Configuration** Menu.

How to Configure Default Tables

1. Choose **admit patient** from the **Configuration** Menu.
2. Choose **Choose patient settings**. Select the table you wish to configure (**default 1** through **default 6**).
3. A popup window appears: **All unsaved changes to the current default will be lost! Are you sure you want to do this?** Choose **Yes**.
4. Choose **Patient type** and select either **Adult, pediatric,** or **neonate.**
5. Change all other available settings as desired.
6. To save your changes for the selected table go to **other system settings**, choose **save default changes**.
7. A popup window appears: **Enter the name for this default**. Rename or accept the default table and choose **DONE**. Your data will be saved.
8. Repeat steps 1 through 7 for configuring the remaining five default tables.

How to Exit Configuration Mode

1. Choose **other system settings** from the **Configuration** Menu.
2. Choose **exit config mode**.
3. A popup window appears: **This will exit configuration mode. All unsaved changes will be lost. Are you sure you want to do this?** Choose **Yes**.
4. The system will automatically restart in patient monitoring mode.

Warning: All monitoring will cease when entering configuration mode. Do not enter this mode if actively monitoring a patient.

Default Table Name	Understanding the Options	Factory Default	Adult	Pediatric	Neonate
Adjust Alarms					
Adjust alarm volume (0 to 5)	It allows the user to adjust the alarm volume. Alarm volume applies to all alarms (excluding system failures.	4			
Choose autoset %	It allows the user to change the percentage at which limits are automatically adjusted around the patient's current condition when the autoset all is confirmed.	20%			
Config settings	It opens the Config Adjust Alarms menu.				
Alarm volume low range	It allows the user to specify the lowest range for which the alarm volume can be adjusted.	1			
Alarm silence time (in min)	It allows the user to adjust the length of time alarms are temporarily silenced when the alarm silence feature is activated.	2			
Admit Patient					
Choose Patient settings	It allows the user to choose a user default table.	ADULT			
View Patient Trends					
Choose graphs to print	Confirmed selections are printed on the bedside recorder when print chosen graphs is chosen. If there are no confirmed selections for this choice when print chosen graphs is confirmed, up to two selections are automatically confirmed. The selections automatically confirmed are the highest priority parameters included in the confirmed patient's parameter list, up to a maximum of two.	0 chosen			
Display as	User can choose whether to view trended derived vital signs data in the Full trends window either numerically or graphically. When the Full trends window is opened, the configured default becomes the confirmed selection of this choice.	numbers			
View vitals every	View vitals every is displayed when Display as in View patient trends is numbers. It allows the user to choose the set of viewable times for which to display data. View vitals for is displayed when Display as in View patient trends is graphs. It allows the user to choose the span of time to be viewed.	NIBP			
Mini trends…	It opens the Mini trends menu which has go to main menu as its first menu choice.	N/A			
View trends on main screen?	It allows the user to turn on or off the viewing of the Mini trends window in the waveform region of the main monitoring screen.	yes			
Display as	User can choose whether to view trended derived vital signs data in the Mini trends window either numerically or graphically.	numbers			

A=adult, P=pediatric, N=neonate. If not specified, the factory default setting is the same for adult, pediatric, and neonate.

Default Table Name	Understanding the Options	Factory Default	Adult	Pediatric	Neonate
View vitals every	"View vitals every" is displayed when "Display as" in Mini trends is numbers. It allows the user to choose the set of viewable times for the Mini trends window. View vitals for is displayed when Display as in Mini trends is graphs. It allows the user to choose the span of time to be viewed in the Mini trends window.	NIBP			
Config Settings	It opens the Config View Patient Trends menu.	N/A			
Save previous patient data?	User specifies whether Select Patient is available or unavailable in clinical mode.	yes			
Trend key default	User specifies which window (either Full trends or Mini trends) that the hardkey activates/deactivates.	mini trends			
Setup HR/Pulse					
Select source	User specifies the source from which HR/Pulse rate is to be derived.	auto			
Adjust QRS volume	User specifies the volume for the QRS beep relative to the other volume settings for alarms and key clicks.	0			
Adjust limits	Patient alarm limits may be adjusted by the auto-set feature or manually.	auto-set			
hi	Allows the user to set the "hi" alarm limit.	150			
lo	Allows the user to set the "lo" alarm limit.	50			
Advanced settings…	It opens the Advanced Setup HR/Pulse menu.	N/A			
Limit alarms priority	User specifies audio alarm associated with limit alarms.	warning			
Change color based on source?	User specifies if HR/Pulse vital sign area color is based on current heart rate source or configured color choice in HR/Pulse parameter.	yes			
Select HR/Pulse's color	User specifies the color for information related to HR/Pulse that is displayed in the Limit and Full and Mini trends windows.	light green			
Setup ECG					
Lead selection	User can choose the lead to be displayed as the ECG waveform.	Lead II			
Waveform size	User specifies the multiplying factor used to change the appearance of the ECG waveforms displayed.	1X			
Pacer detection?	It allows the user to instruct the Monitor to analyze ECG data for pacemaker pulse.	PACE OFF			
Arrhythmia detection	User specifies whether the monitor will detect and display arrhythmia conditions (i.e. Asystole, Vtach, VFib). If an arrhythmia condition is active and alarming, and the user selects no, the arrhythmia condition will be removed. If the condition was of a crisis priority, it will still require user acknowledgement.	yes			
Advanced settings…	It opens the Advanced ECG menu.	N/A			

A=adult, P=pediatric, N=neonate. If not specified, the factory default setting is the same for adult, pediatric, and neonate.

Default Table Name	Understanding the Options	Factory Default	Adult	Pediatric	Neonate
Cardiac sweep speed	User specifies the default sweep speed for all cardiac-based waveforms (except the ECG waveform if Fixed ECG sweep speed? is yes). This choice appears in all menus associated with cardiac-based waveforms. A change in one menu affects all cardiac-based waveforms.	25.0 mm/s			
Cascade ECG?	The user can choose to expand the ECG waveform area into a second waveform area.	no			
Display filter	User specifies the type of display filtering done on raw ECG waveform data before it is displayed or recorded.	0.5 to 40 Hz			
QRS width	User specifies the size of QRS width detection by the EKPro algorithm.	normal			
other alarm priorities	User specifies audio alarm associated with these alarms.	N/A			
VTACH	User specifies the audio alarm associated with ECG VTACH in Adult and Pediatric modes. Menu item is not viewable in Neonate mode.	crisis			
lead fail	User specifies the audio alarm associated with ECG LEAD FAIL.	procedural			
Replace electrodes	User specifies the audio alarm associated with ECG REPLACE ELECTRODES.	procedural			
Artifact	User specifies the audio alarm associated with ECG ARTIFACT.	message			
Select ECG's color	User specifies the color for information displayed in ECG's waveform area.	light green			
Config settings…	It opens the Config ECG menu.	N/A			
Fixed ECG sweep speed?	When yes, the speed of the ECG waveform is fixed at 25.0 mm/s. When no, the speed of the ECG waveform changes according to the Cardiac sweep speed menu choice.	no			
Setup NIBP					
setup custom series	An extended menu where the user may configure a custom auto mode protocol.	N/A			
1st BP Series	User specifies the auto mode interval for step 1 of the protocol.	q5min			
repeat	User specifies the number of determinations to be done at 1st BP series interval.	x4			
2nd BP Series	User specifies the auto mode interval for step 2 of the protocol.	q15min			
repeat	User specifies the number of determinations to be done at 2nd BP series interval.	x4			
3rd BP Series	User specifies the auto mode interval for step 3 of the protocol.	q30min			
repeat	User specifies the number of determinations to be done at 3rd BP series interval.	x2			

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Default Table Name	Understanding the Options	Factory Default	Adult	Pediatric	Neonate
4th BP Series	User specifies the auto mode interval for step 4 of the protocol.	q60min			
repeat	User specifies the number of determinations to be done at 4th BP series interval.	x1			
Auto BP	User specifies the interval of time between auto mode determinations.	manual			
Adjust limits	Patient alarm limits may be adjusted by the auto-set feature or manually.	auto-set			
systolic hi	Allows the user to set the "hi" alarm limit.	A=200, P=150, N=100			
lo	Allows the user to set the "lo" alarm limit.	A=80, P=70, N=40			
diastolic hi	Allows the user to set the "hi" alarm limit.	A=120, P=90, N=60			
lo	Allows the user to set the "lo" alarm limit.	A=30, P=30, N=20			
mean hi	Allows the user to set the "hi" alarm limit.	A=140, P=100, N=70			
lo	Allows the user to set the "lo" alarm limit.	A=40, P=40, N=30			
Advanced settings…	It opens the Advanced NIBP menu.	N/A			
Initial target pressure	User specifies the pressure the Monitor initially pumps to for the next determination.	auto			
Limit alarms priority	User specifies whether the limit alarms associated with NIBP are issued as either warning or crisis alarms.	warning			
other alarm priorities	User specifies audio alarm associated with these alarms.	N/A			
No determination	User specifies the audio alarm associated with NIBP NO DETERMINATION.	procedural			
Overpressure	User specifies the audio alarm associated with NIBP OVERPRESSURE.	procedural			
Pump timeout	User specifies the audio alarm associated with NIBP PUMP TIMEOUT.	procedural			
Total timeout	User specifies the audio alarm associated with NIBP TOTAL TIMEOUT.	procedural			
Level timeout	User specifies the audio alarm associated with NIBP LEVEL TIMEOUT.	procedural			
Select NIBP's color	User specifies the color for information displayed in NIBP's vital sign area as well as information related to NIBP that is displayed in the Limit and Full and Mini trends windows.	purple			
Config settings…	It opens the Config NIBP menu.	N/A			
Auto BP default	User specifies the selection that will be confirmed when Auto BP is manual and the AUTO-BP/STAT hardkey is pressed.	10 min			
Setup SpO2					
View Waveform?	It allows the user the option of viewing the SpO2 waveform area.	yes			
Adjust limits	Patient alarm limits may be adjusted by the auto-set feature or manually.	hi 100 lo 90			
Advanced settings…	It opens the Advanced SpO2 menu.	N/A			

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Default Table Name	Understanding the Options	Factory Default	Adult	Pediatric	Neonate
View signal strength bar?	It allows the user the option of viewing the graphic signal strength bar.	yes			
View SpO2 PR?	Controls how the Monitor behaves concerning the handling of SpO2 derived pulse rate.	no			
Spot check enable	Allows use to specify monitor behavior when the SpO2 LOST PULSE or SpO2 SENSOR OFF alarm is issued.	yes			
Turn C-LOCK® on? (NELLCOR ONLY)	User specifies whether C-LOCK is enabled.	no			
Cardiac sweep speed	User specifies the sweep speed for all cardiac waveforms. This choice appears in all menus associated with cardiac waveforms. A change in one menu affects all cardiac waveforms.	25.0 mm/s			
Limit alarms priority	User specifies audio alarm associated with limit alarms, including SpO2 PR limit alarms if View SpO2 PR? is set to yes.	warning			
Masimo SpO2:					
Lost pulse	User specifies the audio alarm associated with SpO2 LOST PULSE.	procedural			
other alarm priorities	User specifies audio alarm associated with these alarms.	N/A			
Sensor disconnected	User specifies the audio alarm associated with SpO2 SENSOR DISCONNECTED.	procedural			
Sensor Faulty	User specifies the audio alarm associated with SpO2 SENSOR FAULTY.	procedural			
Sensor off	User specifies the audio alarm associted with SpO2 SENSOR OFF.	procedural			
Signal quality (MASIMO ONLY)	User specifies the audio alarm associated with SpO2 SIGNAL QUALITY.	message			
Nellcor SpO2:					
other alarm priorities	User specifies audio alarm associated with these alarms.	N/A			
Lost pulse	User specifies the audio alarm associated with SpO2 LOST PULSE.	procedural			
Sensor disconnected	User specifies the audio alarm associated with SpO2 SENSOR DISCONNECTED.	procedural			
Sensor Faulty	User specifies the audio alarm associated with SpO2 SENSOR FAULTY.	procedural			
Sensor off	User specifies the audio alarm associted with SpO2 SENSOR OFF.	procedural			
Select SpO2's color	User specifies the color for the information displayed in SpO2's vital sign and waveform areas as well as information related to SpO2 that is displayed in the Limit and Full and Mini trends windows.	white			
Config settings...	It opens the Config SpO2 menu.	N/A			
Masimo SpO2:					

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Default Table Name	Understanding the Options	Factory Default	Adult	Pediatric	Neonate
Averaging	User specifies the averaging time used by the Masimo SpO2 algorithm to calculate SpO2 values.	12			
Sensitivity	User specifies the sensitivity thresholds used by the Masimo SpO2 algorithm for calculating SpO2 values under low perfusion conditions.	Normal			
FAST SAT	User specifies the whether or not the Masimo SpO2 algorithm calculates the SpO2 values quicker.	OFF			
Nellcor SpO2:					
Response mode	User specifies the setting for the Nellcor SpO2 algorithm for rejecting noise and calculating SpO2 values.	Fast			
SAT SECONDS (NELLCOR ONLY)	User specifies the time setting for the Nellcor SpO2 algorithm to holf off limit alarms or OFF to disable any hold off.	OFF			
Setup RESP					
Lead to analyze	User can choose the lead from which the respiration waveform is characterized and the impedance respiration rate	A=LII, P=LII, N=L1			
View waveform?	It allows the user the option of viewing the RESP waveform area.	yes			
Waveform size	User specifies the multiplying factor used to change the appearance of the RESP waveform.	1X			
Adjust limits	Patient alarm limits may be adjusted by the auto-set feature or manually.	A=30, P=60, N=100			
hi	Allows the user to set the "hi" alarm limit.	A=30, P=60, N=100			
lo	Allows the user to set the "lo" alarm limit.	A=6, P=10, N=15			
Advanced settings...	It opens the Advanced RESP menu.	N/A			
Resp sweep speed (mm/s)	User specifies the sweep speed for all respiratory waveforms. This choice appears in all menus associated with respiratory waveforms. A change in one menu affects all respiratory waveforms.	A/P=12.5, N=6.25			
Cardiogenic filter	It allows the user to select the type of filtering performed.	auto			
Detection threshold	User adjusts the cursor on the impedance waveform to specify the breath detection threshold.	"--"			
Limit alarms priority	User specifies audio alarm associated with limit alarms.	warning			
other alarm priorities	User specifies audio alarm associated with these alarms.	N/A			
Resp approaching	The user specifies the alarm type associated with RESP RATE APPROACHING HR.	warning			
Lead Fail	User specifies the audio alarm associated with RESP LEAD FAIL.	procedural			
Saturation	User specifies the audio alarm associated with RESP BASELINE SATURATION.	procedural			
Artifact	User specifies the audio alarm associated with RESP ARTIFACT.	procedural			

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Default Table Name	Understanding the Options	Factory Default	Adult	Pediatric	Neonate
Select RESP's color	User specifies the color for information displayed in RESP's waveform and vital sign areas as well as information related to RESP that appears in the Limit and Full and Mini trends windows.	light blue			
Config settings…	It opens the Config RESP menu.	N/A			
Turn on RESP with ECG?	User specifies whether auto-switching Resp parameter is or is not active.	no			
Setup TEMP					
Unit of Measure	User specifies the unit of measure used to display temperature readings.	°F			
Choose mode	User specifies temperature's mode of operation.	predictive			
Advanced Settings…	It opens the Advanced TEMP menu.	N/A			
other alarm priorities	User specifies audio alarm associated with these alarms.	N/A			
Bad Probe	User specifies the audio alarm associated with TEMP BAD PROBE.	procedural			
Too Hot	User specifies the audio alarm associated with TEMP TOO HOT.	procedural			
Disconnected	User specifies the audio alarm associated with TEMP DISCONNECTED.	procedural			
Select TEMP's color	User specifies the color for information displayed in TEMP's vital sign area as well as information related to TEMP that is displayed in the Limit and Full and Mini trends windows.	yellow			
Config settings…	It opens the Config TEMP menu.	N/A			
Allow °C units only?	User specifies whether the units used to display the temperature must always fixed on °C. For some European countries, temperature must always be displayed in °C.	no			
Setup RECORDER					
print on alarm	User specifies whether the detection of patient-type warning or crisis alarm generates an Alarm print.	no			
vitals summary with printout	User specifies whether or not a Vitals Summary block of info is printed at the beginning of real time printouts.	no			
Auto printout of vitals summary	User specifies whether an auto printout of Vitals Summary is initiated at the end of an NIBP/TEMP determination.	OFF			
setup continuous	Allows the user to access continuous options.	N/A			
Waveforms to record	User specifies the waveforms that are traced for a Continuous recording.	1 chosen			
setup timed	Allows the user to access timed options.	N/A			
Waveforms to record	User specifies the waveforms that are traced for a Timed recording.	0 chosen			
Chart speed	It allows the user to choose the tracing speed of a Timed recording.	25.0 mm/s			
Length of strip (in seconds)	Length of Timed recording.	8			

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Default Table Name	Understanding the Options	Factory Default	Adult	Pediatric	Neonate
Record key printout	It allows the user to specify the location of printouts that result from pressing the record .	at bedside			
Config settings…	It opens the Config RECORDER menu.	N/A			
setup continuous	Allows the user to access continuous options.	N/A			
Delayed memory (in seconds)	Delayed memory in seconds.	8			
Length of strip (in seconds)	Length of Alarm trace.	20			
setup timed	Allows the user to access timed options.	N/A			
Delayed memory (in seconds)	Delayed memory in seconds.	4			
Other System Settings					
Always display battery icon?	User controls when battery icon is viewable when monitor in not on battery power.	no			
Advanced Settings…	It opens the Advanced Other System Settings menu.	N/A			
Select color format	User specifies Monitor color configuration.	full color			
Adjust keyclick volume	User specifies the volume of the sounds as listed in USER INTERFACE OVERVIEW.	2			
Adjust system volume	User specifies the volume of the overall system.	8			
Config settings…	It opens the Config Other System Settings menu.	N/A			
Select date format	User specifies the format the date appears on the screen and on all recordings.	mm/dd/yy			
Select time format	User specifies how time is to be formatted when it appears on the display and all recordings. For all languages, when am/pm is confirmed, the time is displayed as HH:MM am or HH:MM pm.	military			
Language	The user specifies the language to be used for text that appears throughout the Monitor's user interface. The language choice is active for all patient settings tables. The new language becomes effective upon selection but is not copied onto the active table until save default changes has been confirmed. The language confirmed has no influence on service mode which is always in English.	english			
Display units?	The user specifies whether the unit of measure for all parameters is displayed in each parameter's respective vital sign area.	yes			
Display limits?	The user specifies whether alarms limits for all parameters are displayed in each parameter's respective vital sign area.	yes			
Config HostComm					
Unit address	It allows the user to specify the host communications address for this particular monitor.	" "			
IP address	User specifies address for 1928 communication.	0.0.0.0			
Waveforms to send	It allows the user to specify the waveforms to be sent when a serial port is communicating via the MPS binary protocol.	2 chosen			

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Default Table Name	Understanding the Options	Factory Default	Adult	Pediatric	Neonate
Remote access	User specifies which port, if any, is enabled for remote access.	OFF			
Serial 1 setup	Allows user to configure serial 1 port settings.	N/A			
Startup mode	User specifies the protocol of this port on monitor power-up.	ASCII cmd			
Baud rate	User specifies serial data transfer for this port.	9600			
Serial 2 setup	Allows user to configure serial 2 port settings.	N/A			
Startup mode	User specifies the protocol of this port on monitor power-up.	ASCII cmd			
Baud rate	User specifies serial data transfer for this port.	9600			

A=adult, P=pediatric, N=neonate. If not specified, the factory default setting is the same for adult, pediatric, and neonate.

APPENDIX C:
Error Codes

C.1 ALARM CODE INTERPRETATION

Refer to Section, 4.4.3 Battery Troubleshooting, for information about procedural alarms that involve battery operation. If any other alarms display that are not listed in the paragraphs that follow, record the error message and report the failure to Customer Support. Refer to the Operations Manual for information about patient alarms and general procedural alarms.

C.1.1 System Failures

When a system failure is encountered, the error code is displayed on the screen for five seconds and the system enters failsafe mode. The error code is recorded in the history log.

General system error codes are listed below. If any other **SY** or similar code displays, report it to Customer Support.

System Error Messages

Error Code	Explanation	Possible Error Source
SY-16	Power fail signal true time is too long	Main CPU Board
SY-19	Software detected power supply out of limits failure	Main CPU Board
SY-20	Checksum of code in Flash Memory is not valid	Main CPU Board
SY-40	Unexpected interrupt	Main CPU Board
SY-43	Real time clock (DS1284) running too slow	Main CPU Board
SY-44	Real time clock (DS1284) running too fast	Main CPU Board

Hardware Error Messages

Error Code	Explanation	Possible Error Source
8193	HW, Time Base Failure	Main CPU Board
8202	HW, Power Supply, System Failure	Power Supply, Main CPU Board
8222	HW, RAM Test Failure	Main CPU Board
8232	HW, ROM Checksum failure	Main CPU Board
8252	HW, Secondary processor not compatible	Main CPU Board
8253	HW, Secondary communications failure	Main CPU Board
26631	Operating system 300 Hertz timer re-entry error	Main CPU Board
27268	Unexpected error condition	Main CPU Board

NIBP Parameter Error Messages

Decimal Error #	Explanation	Possible Error Source
110	Overpressure circuit failure.	Main CPU Board
112	Overpressure watchdog error	Main CPU Board
130	EEProm read failure.	Main CPU Board
131	EEProm write failure	Main CPU Board
140	Transducer initialization failure.	Main CPU Board, Pneumatic Assembly
141	Calibration of a transducer channel's zero failed.	Main CPU Board, Pneumatic Assembly
142	Calibration of a transducer channel's span failed.	Main CPU Board, Pneumatic Assembly
150	Auto zero failure.	Main CPU Board, Pneumatic Assembly
151	Auto zero. Verify failed.	Main CPU Board, Pneumatic Assembly
170	Pump current failure	Pneumatic Assembly, Main CPU Board
171	Pump current value out of NI_RANGE.	Pneumatic Assembly, Main CPU Board
180	Excessive leakage.	Pneumatic Assembly, Interface Panel
190	Commands out of sequence	Main CPU Board
200	Ovp setpoint not found	Main CPU Board
210	Pump stuck on during idle	Pneumatic Assembly, Main CPU Board
220	Valve in illegal state	Pneumatic Assembly, Main CPU Board
221	Pressure too high for too long	Main CPU Board, Pneumatic Assembly

Temperature Parameter Error Messages

Decimal Error #	Explanation	Suggested Replacement
111	software error -state machine bad probe number	Main CPU Board
112	Temp sample rate error	Main CPU Board
113	Temp lost synchronization with PIC	Main CPU Board
114	Unable to synchronize with the Temp PIC	Main CPU Board

ECG Parameter Error Messages

Decimal Error #	Explanation	Suggested Replacement
101	ECG board data rate error	ECG Board
102	ECG board revision not compatible	ECG Board
103	ECG board hardware error	ECG Board
109	Processing of ECG waveform too far behind	ECG Board, Main CPU Board
113	Data requested from ECG data manager is not available	ECG Board
114	Data requested from ECG data manager is not available	ECG Board
128	Errors returned while generating analog O/P	ECG Board
128-132	Errors returned while generating analog O/P	ECG Board
201	ECG board command queue overrun	ECG Board

SPO2 Parameter Error Messages

Decimal Error #	Explanation	Suggested Replacement
125	too many reset requests	SPO2 Board, Main CPU Board
126	Nellcor has posted a "serious" FE error	SPO2 Board
129	FE data OK- processing stallled	SPO2 Board
130	MASIMO has posted either a board or diagnostic failure -- type available in service mode	SPO2 Board
131	msg looks out of sequence	SPO2 Board
132	missing characters inside a packet	SPO2 Board
133	not able to correctly set parameter	SPO2 Board
134	NELL_SendCommand() called before previous call completed	SPO2 Board
135	Not enough room left in transmit FIFO to send data	SPO2 Board
136	Receive FIFO full, probably lost data	SPO2 Board
137	queue out to OEM board is full	SPO2 Board
138	Nellcor has posted too many auto resets	SPO2 Board
139	Nellcor software error	SPO2 Board
140	Nellcor has posted too many communication errors	SPO2 Board
141	No communication with SPO2 board. Unit may be configured incorrectly	SPO2 Board

Recorder Parameter Error Messages

Decimal Error #	Explanation	Suggested Replacement
101	output (to printer) queue overflow	Printer
102	output (to printer) queue overflow	Printer
103	output (to printer) queue overflow	Printer
104	input queue (from system) overflow	Printer
105	queue freeze error	Printer
110	invalid speed setting	Printer
111	invalid number of waves setting	Printer
112	invalid density setting	Printer
114	bad command	Printer
115	bad command	Printer
120	queue not initialized	Printer
121	annotation queue overflow	Printer
122	invalid location	Printer
123	not enough room	Printer
140	bad command for this mode	Printer
141	bad command for this mode	Printer

Respiration Parameter Error Messages

Decimal Error #	Explanation	Suggested Replacement
101	This means something was wrong with memory at wake up. Couldn't get data space.	ECG Board
102	These last three mean that the algorithm execution couldn't keep up with the data acquistion	ECG Board
103		
104		

APPENDIX D:
Required Service Equipment

D.1 REQUIRED SERVICE EQUIPMENT

- ECG simulator (DNI model 214B or equivalent)
- ECG cable (pn 107326 & 107328)
- SPO2 simulator (Nellcor recommends use of the SRC-MAX Portable Tester; Masimo recommends BIO-TEK SpO2 simulators)
- SPO2 adapter cable
- NIBP analyzer (DNI Nevada "CuffLink" or equivalent)
- Adult Cuff (pn 2774)
- Adult Hose (pn 107365)
- Adult mandrel, end block and spacer blocks (DNI pn 5215-0268,5215-0269)
- Calibration Kit, pn 320246 available through GE Medical Systems
- Inflation bulb and associated tubing
- Manometer Digital 0-600mmHg range or equivalent
- Temperature probe simulator (Alaris pn TE1811)
- Temperature probe, oral
- Oscilloscope (capable of measuring ECG signal @ 0.75Hz, 1V amplitude)
- 1/8" stereo plug (Radio Shack # 274-284C)
- Hipot Tester (1500VAC)
- Safety Tester (DNI Nevada 235A or equivalent)
- DMM (Fluke 8842 or equivalent)
- Temp probe Hi Pot adapter (Temp probe assembly with probe removed and probe cable leads shorted and attached to connector compatible with Hi Pot tester.)
- SpO_2 probe Hi Pot adapter (SpO_2 adapter cable with leads shorted and attached to connector compatible with Hi Pot tester.)
- ECG Hi Pot adapter (ECG cable with leads shorted and attached to connector compatible with Hi Pot tester.)
- Serial communication cable (see Figure 3)
- Test plug assembly with 470Ω resistor

NOTE: Hi-Pot testing is done on every unit at the factory and should not be repeated unnecessarily nor performed more often than required. (If unit is opened for repair, Hi-Pot testing is required.)

APPENDIX E:
Troubleshooting

E.1 TROUBLESHOOTING

Problem: Unit will not power on

Cause:

- No AC Power
- Faulty power supply
- Faulty PSU PWA
- Faulty Main Board
- Faulty cables
- Faulty power Off/On front panel switch

Solution:

- Check AC Power
- Replace power supply; FRU # 2014832-001
- Replace PSU PWA; FRU # 2014829-001
- Replace Main Board; FRU # 2013782-001
- Replace defective cable; FRU # 2014843-001 or 2014828-001
- Replace defective keyboard PWA; FRU # 2013781-001

Problem: Unit will not operate on battery

Cause:

- Rear case battery disconnect fuse open or not plugged in
- Faulty battery pack
- Faulty PSU PWA

Solution:

- Plug in or replace battery disconnect fuse; Part # 628192
- Replace battery pack; FRU # 2014833-001
- Replace PSU PWA; FRU # 2014829-001

Problem: Unit will not operate on external DC power

Cause:

- Faulty DC input jack/DC cable
- Faulty PSU PWA

Solution:

- Replace DC input jack/cable; FRU # 2014835-001
- Replace PSU PWA; FRU # 2014829-001

Problem: Unit powers on but no display

Cause:

- Faulty display
- Faulty backlight driver
- Faulty Main Board
- Faulty PSU PWA

Solution:

- Replace display; FRU # 2013792-001

- Replace Main Board; FRU # 2013782-001
- Replace Main Board; FRU # 2013782-001
- Replace PSU PWA; FRU # 2014829-001

Problem: Unit will not perform NIBP function

Cause:

- Faulty Main Board
- Faulty pneumatics assembly
- Faulty pneumatics cable
- Faulty front panel switch

Solution:

- Replace Main Board; FRU # 2013782-001
- Replace pneumatics assembly; FRU # 2013788-001 or 2014830-001
- Replace defective keyboard PWA; FRU # 2013781-001

Problem: Unit will not perform ECG function

Cause:

- Faulty ECG PWA assembly
- Faulty ECG cable assembly
- Faulty Main Board

Solution:

- Replace ECG PWA; FRU # 2013778-001
- Replace ECG cable; FRU # 2014620-001
- Replace Main Board; FRU # 2013782-001

Problem: Unit will not produce an analog ECG waveform output

Cause:

- Faulty Defib cable assembly
- Faulty Main Board

Solution:

- Replace Defib cable assembly; FRU # 2014619-001
- Replace Main Board; FRU # 2013782-001

Problem: Unit will not perform SPO2 function

Cause:

- Faulty SPO2 PWA assembly
- Faulty Main Board

Solution:

- Replace SPO2 PWA; FRU # 2013783-001 Nellcor or 2013786-001 Masimo
- Replace Main Board; FRU # 2013782-001

Problem: Unit will not perform Temperature function

Cause:

- Faulty temperature probe

- Faulty temperature probe sensor
- Faulty Main Board

Solution:

- Replace temperature probe
- Replace probe sensor; FRU # 2013777-001
- Replace Main Board; FRU # 2013782-001

Problem: Unit will not print

Cause:

- Unit out of paper or paper incorrectly installed
- Faulty printer
- Faulty Main Board
- Faulty PSU PWA

Solution:

- Check paper installation
- Replace printer; FRU # 2013787-001
- Replace Main Board; FRU # 2013782-001
- Replace PSU PWA; FRU # 2014829-001

Problem: Unit will not generate sound

Cause:

- Faulty speaker assembly
- Faulty Main Board

Solution:

- Replace speaker assembly; FRU # 2014831-001
- Replace Main Board; FRU # 2013782-001

Problem: Unit will not respond to rotary knob

Cause:

- Faulty encoder
- Faulty Main Board

Solution:

- Replace encoder; FRU # 2014712-001
- Replace Main Board; FRU # 2013782-001

Problem: Unit Host Comms not functional

Cause:

- Faulty Main Board
- Faulty PSU PWA

Solution:

- Replace Main Board; FRU # 2013782-001
- Replace PSU PWA; FRU # 2014829-001

APPENDIX F:
Field Replacement Units (FRUs)

F.1 FRU IDENTIFICATION TABLE

The following table offers details of each of the corresponding bubble numbers that appear on the FRU assembly drawings.

FRU IDENTIFICATION TABLE			
Bubble Number	**Item Number**	**Item Description**	**Notes**
0	2014595-001	KIT, HRDWR, SCREWS & WASHERS DP1100 FRU	All internal hardware, screws, washers, spacers, etc.
1	2013774-001	PLASTIC FRONT CASE PRO1000V3 FRU	Must order correct fascia for country.
3	2013776-001	ASSY, INTERFACE PANEL & COVER PRO1000V3 FRU	If Temperature version, order FRU #2013777-001
4	2013777-001	ASSY, PARAMETER CABLE ASSYS, PRO1000V3 FRU	
5	2013778-001	ASSY, PWA ECG BOARD PRO1000V3 FRU	If ECG cable is needed, order FRU #2016503-001.
7	2013781-001	ASSY, PWA KEYBOARD PRO1000V3 FRU	
8	2013782-001	ASSY, PWA MAIN BOARD PRO1000V3 FRU	
9	2013783-001	ASSY, NELLCOR SPO2 BOARD & HARDWARE FRU	This kit includes the Nellcor PWA, hardware and spacers for PRO Series, ProCare and PRO 1000V3 Monitors using Nellcor SPO2.
10	2013786-001	ASSY, MASIMO SPO2 BOARD & HARDWARE FRU	This kit includes the Masimo PWA, hardware and spacers for PRO Series, ProCare and PRO1000V3 Monitors using Masimo SPO2.
11	2013787-001	KIT, PRINTER PRO1000V3 FRU	Includes all printer assembly items, printer door, printer button, cable assembly, and label.
12	2013788-001	KIT, PNEUMATIC 12V ASSY PRO1000V3 FRU	Pump Assembly.
13	2016503-001	KIT, CABLE ASSEMBLIES, PRO1000V3 FRU	
16	2013792-001	KIT, LCD & CABLE, NEC PRO1000V3 FRU	Display Cable is included.
18	2013794-001	KIT, FASCIA PRO1000 ENGLISH FRU	
19	2013795-001	KIT, FASCIA PRO1000 SPANISH FRU	
20	2013796-001	KIT, FASCIA PRO1000 FRENCH FRU	
21	2013797-001	KIT, FASCIA PRO1000 GERMAN FRU	
22	2013798-001	KIT, FASCIA PRO1000 RUSSIAN FRU	
23	2013799-001	KIT, FASCIA PRO1000 HUNGARIAN FRU	
24	2013800-001	KIT, FASCIA PRO1000 POLISH FRU	
25	2013801-001	KIT, FASCIA PRO1000 CHINESE FRU	
26	2013802-001	KIT, FASCIA PRO1000 JAPANESE FRU	
27	2017290-001	KIT , FASCIA PRO1000 PORTUGESE FRU	
28	2017291-001	KIT , FASCIA PRO1000 ITALIAN FRU	
30	2014694-001	ASSY, NON-TEMP INTERFACE PANEL DP1100 FRU	
31	2014711-001	ASSY, PRINTER BLANKING PLATE, DP1100 FRU	Used only on non-printer versions.
32	2014712-001	ASSY, ROTOR KNOB & ENCODER, DP1100 FRU	Includes, knob, rotor, and washer.
36	2014829-001	ASSY, PWA PSU BOARD PRO1000V3 FRU	
37	2014831-001	ASSY, SPEAKER PRO1000V3 FRU	
38	2014832-001	ASSY, PSU MODULE 60W PRO1000V3 FRU	
39	2014833-001	ASSY, BATTERY PACK & BRACKET PRO1000V3 FRU	

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